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Rock Products

and CEMENT and ENGINEERING NEWS (Est. 1896)

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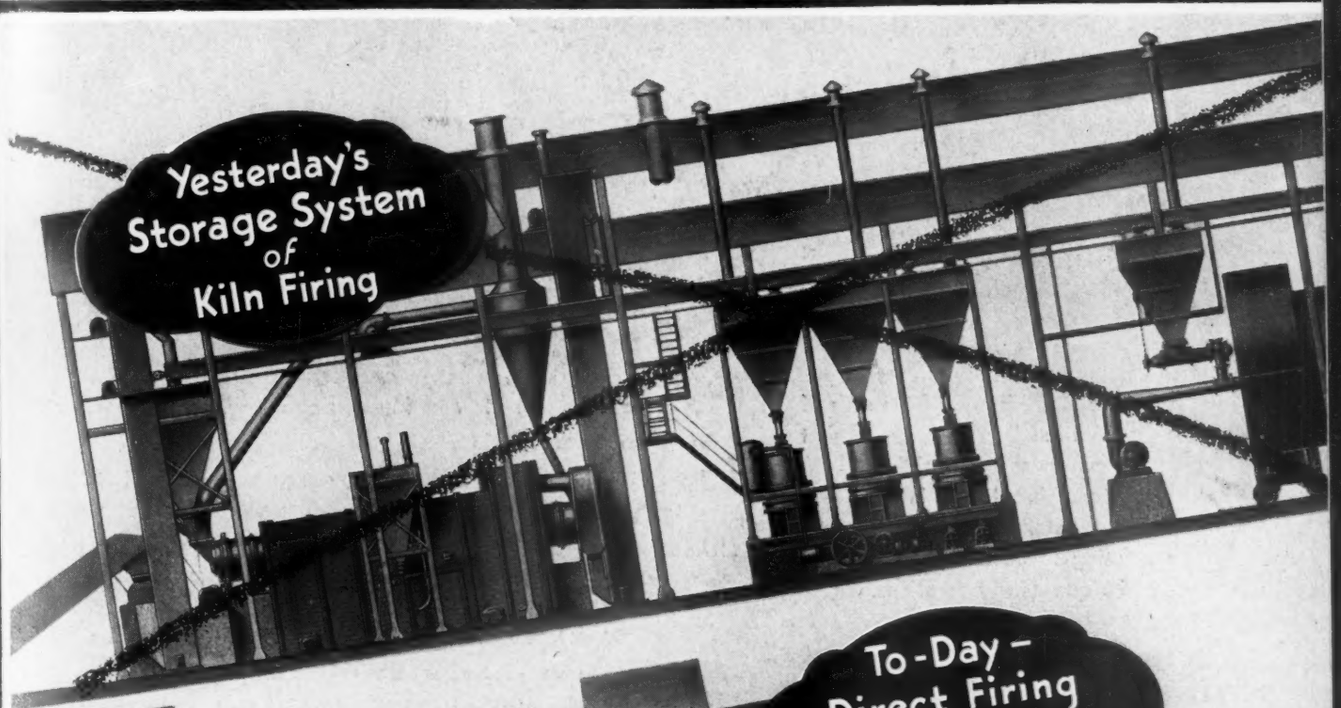
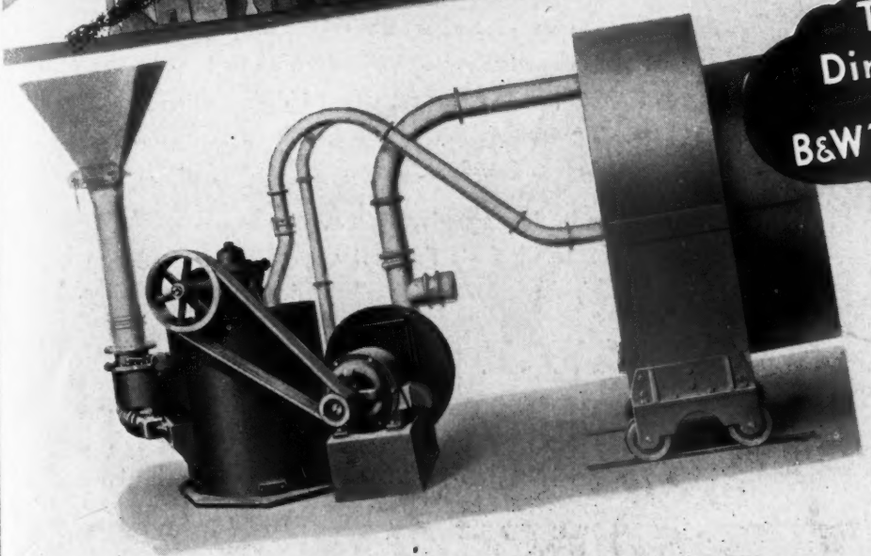




CUTS COSTS of REPAIRS POWER COAL

WRITE FOR DETAILS

The Babcock & Wilcox Company, 85 Liberty Street, New York

BABCOCK & WILCOX

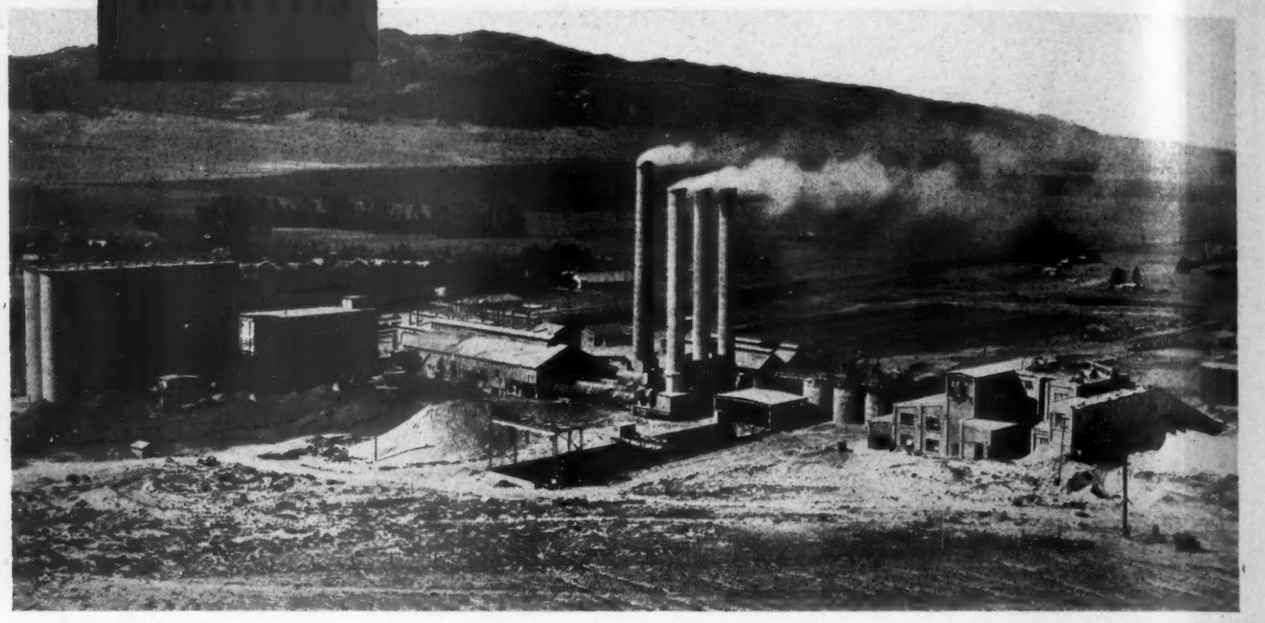
6 MONTHS

HALAFAX EXPLOSIVES

the newest of commercial blasting agents

● INTRODUCED ● PROVED ● ACCEPTED

BY LEADING PRODUCERS OF ROCK PRODUCTS



Illustrated is one of the mills of the Monolith Portland Cement Co. near Monolith, Calif. Monolith, a leader in the industry, is this year consistently using Halafax Explosives in all its quarrying operations.

Halafax accomplishments and Halafax economy, substantial reasons for acceptance by leaders in the industry, are due primarily to these three factors: Halafax contains chlorate of potash. Halafax is 20% lighter in weight than other explosives—yet the price per pound is the same. Halafax is free from separation and deterioration. Result: Halafax Explosives break more ground per pound of powder.

Add these important features: CHEMICAL STABILITY—no leaking fluids; no bleeding, no creeping or separation in storage; PHYSICAL STABILITY—no change in consistency or efficiency due to temperature conditions; uniform composition in every cartridge; HANDLING—no nausea to personnel handling the explosives; available in standard sticks 20 strength and up; also in free flow form.

The story of Halafax Explosives is available in booklet form—"What Is Halafax?" It details facts that not only are interesting, but important to you. Your request for copies will receive prompt attention.

HALAFAX

HALAFAX EXPLOSIVES CO.

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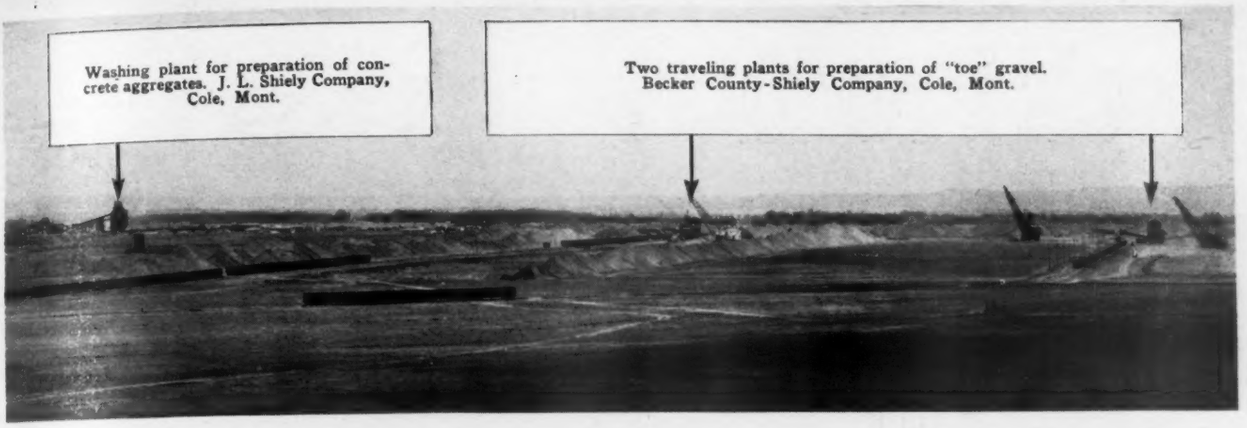
PLANT AND MAGAZINE: Saugus, California


Washing plant for preparation of concrete aggregates. J. L. Shiely Company, Cole, Mont.
Two traveling plants for preparation of "toe" gravel. Becker County-Shiely Company, Cole, Mont.

3 LINK-BELT PLANTS Producing Material for Fort Peck Dam

One of the two Link-Belt traveling plants owned by Becker County-Shiely Company, Cole, Montana. These plants produce, and load into cars "toe" gravel for the Fort Peck Dam. The sand is screened out and returned to pit, the oversize being delivered to trucks for disposal.

TWO of these plants are of the traveling type mounted on car wheels and operating on wide gauge tracks. They are owned by the Becker County-Shiely Company, and operate at Cole, Montana, producing "toe" gravel for the toe or bottom of the slope of this earth-filled dam. The stationary plant also located at Cole, is owned by J. L. Shiely Co. and produces washed and screened sand and gravel for concrete tunnel lining, retaining walls, spill-ways, etc. Send for book No. 1240.

LINK-BELT COMPANY 5401

The Leading Manufacturer of
Equipment for Handling Materials and Transmitting Power
PHILADELPHIA . CHICAGO . INDIANAPOLIS . ATLANTA
SAN FRANCISCO . TORONTO Offices in Principal Cities

Stationary plant owned by J. L. Shiely Company at Cole, Montana, which produces sand and gravel for Fort Peck Dam.

Rock Products

With which is Incorporated **CEMENT and ENGINEERING NEWS** Founded 1896

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September, 1935

TABLE OF CONTENTS

Recovery Progress—Trends—Editorial Comment..25-26

Flexible Quarry Operation Built Around Steel Derricks 28-29

What About the Rising Accident Rate?.....30-31
Action Needed to Turn the Tide of Cement Mill Mishaps. By A. J. R. Curtis.

Are All Dusts Harmful?.....32-33
A Further Discussion of Silicosis and Lung Disability, Supplementing the Article Which Appeared on pages 40 to 45, inclusive, of Rock Products *for May, 1935.*

Portable Gravel Plant—Dredge Operated—Erected and in Operation in Five Days.....34-35

Building Materials Used in American Homes..... 36
By Oliver Bowles

Relationship of Mill Charge to Surface Area of Cement 38-42
By W. R. Chandler

Block Plant Takes Advantage of Quarry Site.....54-55

How to Vulcanize Damaged Conveyor Belts.....56-57
By Paul Wm. Van Orden

Departments

Editorial Comments 25-26
Chemists' Corner 38-42
Hints and Helps.....44-45
Financial News and Comment.....46-47
Traffic and Transportation.....50-51
Lime Producers' Forum.....52-53
Cement Products 54-55
New Machinery 58-59
The Industry 61
Classified Directory of Advertisers.....64, 66, 68

INDEX OF ADVERTISERS

A

Allis-Chalmers Mfg. Co.. 18
American Cable Co., Inc. 77
American Pulverizer Co. 69
American Steel & Wire Co. 17
Atlas Powder Co..... 23

B

Babcock & Wilcox Co.... .....Front Cover
Bacon, Earle C., Inc.... 77
Blaw Knox Co..... 74
Bonnot Company 70
Bradley Pulv. Co..... 73
Broderick & Bascom Rope Co. 12
Bucyrus-Erie Co. 21

C

Cement Process Corp.... 76
Chain Belt Co..... 20
Chicago Perforating Co.. 75
Classified Advertisements 77-78-79
Classified Directory of Advertisers 64-66-68
Cleveland Wire Cloth & Mfg. Co. 72
Cross Engineering Co..... 70

D

Dixie Machy. Mfg. Co.... 74

E

Eagle Iron Works..... 76
Ehrsam, J. B., & Sons Mfg. Co. 75
Ensign-Bickford Co. 63

F

Firestone Tire & Rubber Co. 4-5
Frog, Switch & Mfg. Co.. 75
Fuller Co. 16

G

General Electric Co..... 24
Good Roads Machy. Corp. 76
Gruendler Crusher & Pulv. Co. 76
Gulf Refining Co..... 65

H

Halafax Explosives Co... .....Inside Front Cover
Hardinge Co., Inc..... 75
Harnischfeger Corp. 71
Harrington & King Perforating Co. 76
Hayward Company 75
Hendrick Mfg. Co..... 69
Hetherington & Berner, Inc. 72

I

Industrial Brownhoist Corp. 71

K

Kansas City Hay Press Co. 76
Koehring Co. 67

L

Leschen, A., & Sons Rope Co.....Inside Back Cover
Lewistown Fdy. & Mach. Co. 74
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.) 15
Link-Belt Co. 1, 70
Ludlow-Saylor Wire Co.. .....Inside Back Cover

M

Macwhyte Company 3
Manhattan Rubber Mfg. Div. of Raybestos, Manhattan, Inc. ...Back Cover
McLanahan & Stone Corp. 74
Morris Machine Works... 73
Morrow Mfg. Co..... 72

N

National Wire Cloth Co.. 75
Nordberg Mfg. Co..... 13

P

Pennsylvania Crusher Co. 74
Pioneer Gravel Equipment Mfg. Co. 69
Productive Equipt. Corp. 74

R

Raymond Bros. Impact Pulv. Co. 8-9
Robins Conveying Belt Co. 71
Roebling, John A., Sons Co. 19
Ryerson, Jos. T., & Sons, Inc. 77

S

Sauerman Bros. 75
SKF Industries, Inc..... 10
Smidth, F. L., & Co..... 80
Smith Engineering Works 22

T

Texas Company 14
Timken Roller Bearing Co. 62
Traylor Eng. & Mfg Co.. 7

U

Universal Vibrating Screen Co. 72
Used Equipment 77-78-79

W

Wellman Engineering Co. 77
Wilfley, A. R., & Sons, Inc. 74
Williams Patent Crusher & Pulv. Co..... .....Inside Back Cover
Williamsport Wire Rope Co. 6
Worthington Pump and Machy. Corp. 11

(Rock Products is indexed in the "Industrial Arts Index," which can be found in any Public Library)

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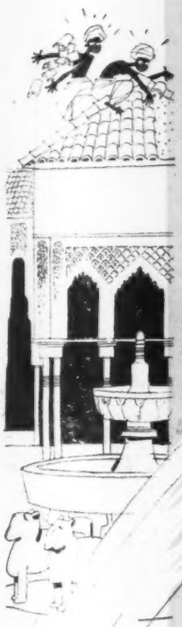
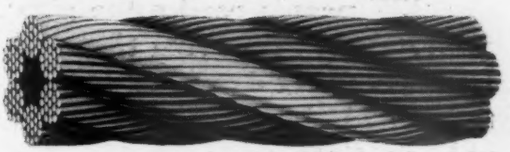
Too bad the ancient Moors didn't have

MONARCH WHYTE STRAND

when they built the Alhambra . . .





This triple-feature wire rope gives extra service on tough digging jobs

● When the going is severe, experienced engineers specify Monarch Whyte Strand. This triple-feature rope is specially designed for digging operations where super-strength and maximum dependability are essential.

1. High stamina is assured by careful heat treating and drawing of each individual wire.

2. Internal lubrication (a special kind that is not affected by heat, cold or ordinary acids) protects each wire in the strand against internal corrosion and internal friction.

3. PREFORMED construction withstands bending with minimum of strain . . . service is increased.

Breaks All Records!

A well-known eastern quarry installed Monarch Whyte Strand (1⅛" 6x19FB Lang Lay *Preformed* IWRC) on a Bucyrus-Erie Electrical Shovel on August 21, 1934. At the last report, the rope was still in operation—after handling 92,000 tons of rock and 2,000 tons of dirt. Best previous record made with *Preformed* rope was 76,000 tons.

Write for folders, "The Why in Macwhyte *Preformed* Wire Rope" and "Information Helpful in Specifying Wire Rope."

AD NO. 173

MACWHYTE COMPANY
KENOSHA, WISCONSIN

Makers of a complete line of wire ropes for shovels, drag line excavators, slack line excavators, quarry derricks, digging and bucket hoist lines, clamshell cranes, and special Hi-Lastic lines for blast-hole drilling.

MONARCH WHYTE STRAND

PREFORMED and Internally Lubricated Wire Rope

CARRYING *Fifty Tons*

OPERATING OVER JAGGED ROCK, MUD, SAND IN DESERT HEAT, MOUNTAIN COLD

FEW people realize the gigantic undertaking in moving the earth to build the great dams and bridges of today and the important part that rubber tires play in this work. Firestone has developed pneumatic tires to withstand the tremendous power and pressure of the giant earth moving equipment which digs up and carries fifty tons of earth and rock in a single load. The largest of these tires, weighing more than five hundred pounds, stands as tall as a man and is as thick as his body. On other units sometimes as many as sixteen tires are used. Firestone Tires work daily on mighty projects that are making history: the All-American Canal, Boulder Dam, the Tennessee Valley development, the Grand Coulee Dam, the San Francisco-Oakland Bay Bridge, the Golden Gate Bridge and dozens of others.

In every Firestone Tire, it is the Firestone cord body made stronger — more flexible and blowout-proof by Gum-Dipping, and the Firestone Non-Skid tread, scientifically designed for maximum traction and safety in its particular service, which have earned for Firestone Tires the reputation of giving lowest cost per mile.

No matter what your type of service — light or heavy hauling, short runs or cross-country schedules, there is a Firestone Truck Tire to give you lower operating costs and more dependable service.

Listen to the Voice of Firestone—featuring Margaret Speaks, Soprano, and the Firestone Choral Symphony, with William Daly's Orchestra—every Monday night over N. B. C.—WEAF Network

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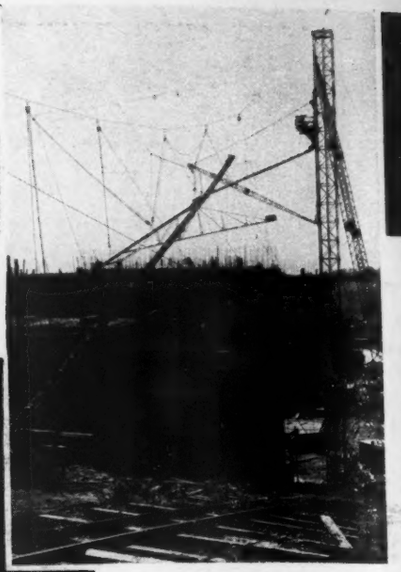
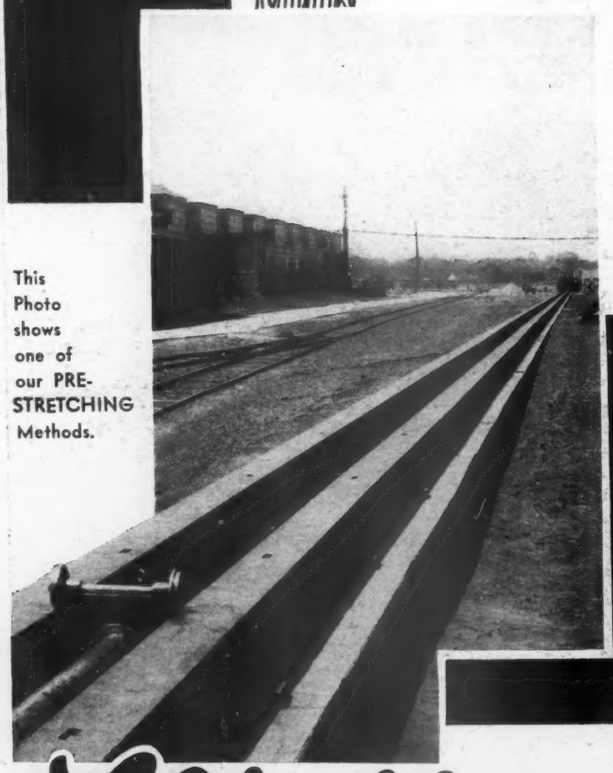
Let's Get Together

and study with you



YOUR WIRE ROPE PROBLEMS

By reason of the vast technical experience we have compiled in relation to the use of ropes of proper construction in various operations, we may be of great help to you in the economical operation of equipment that may now be causing you trouble and excessive expense.



This Photo shows one of our PRE-STRETCHING Methods.

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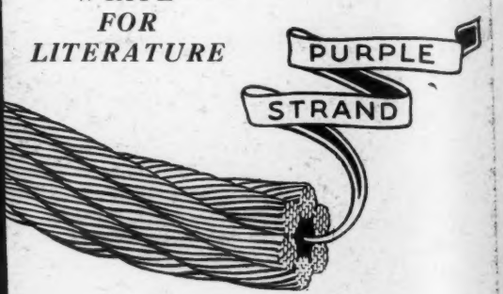

Williamsport

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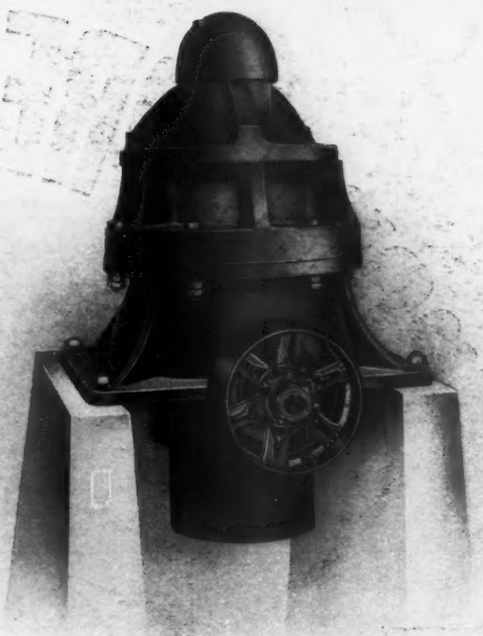

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TYPE TY CRUSHER

One user of a 1'8" Traylor Type TY Reduction Crusher — a prominent sand and gravel operator in the South—says: "We're shipping 42 tons per hour over the spout of that little machine."

We recognize this as a most remarkable performance, and one only possible under unusually favorable conditions and by expert operation. We claim no such results as this but we know from what other users have told us that our Type TY machines are unequaled for simplicity, convenience, economy and production.

We have recently amplified this line and now offer the TY in sizes 1'8", 2'4" and 3'0", the total range of which is from 10 tons hourly to 1/4" to 140 tons hourly to 1 3/4". We have an interesting leaflet we'd like you to read and our salesmen have still more interesting things to tell you. Write to our office nearest you.

Don't forget—you LOSE if you don't USE Traylor!

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It is built around an entirely new grinding principle that increases production efficiency — and reduces wear, vibration and noise by eliminating metal-to-metal contact in pulverizing. Its distinctive feature is a revolving bowl, or grinding chamber, which insures constant movement of the material by centrifugal action. There are never any "dead zones" in the mill. As soon as the feed enters the bowl, it is thrown against the inclined sides and forced between the rolls and the grinding ring until reduced fine enough to pass into the air separator.

This produces rapid reduction of the material with minimum consumption of power and record low costs per ton of product. For long runs at sustained capacity, unusual economies are shown in pulverizing coal, limestone, gypsum and other non-metallic minerals and manufactured products.

BOWL MILLS are available in sizes from one to twenty tons per hour for a fineness range of 10 to 325-mesh material — for all general industrial applications, and for direct-firing coal to boilers, furnaces and kilns.

BOWL MILL — ON-STOP SERVICE

for **uninterrupted, trouble-free operation for 24 hours a day, month after month, without shutdowns**

RAYMOND BROS. IMPACT

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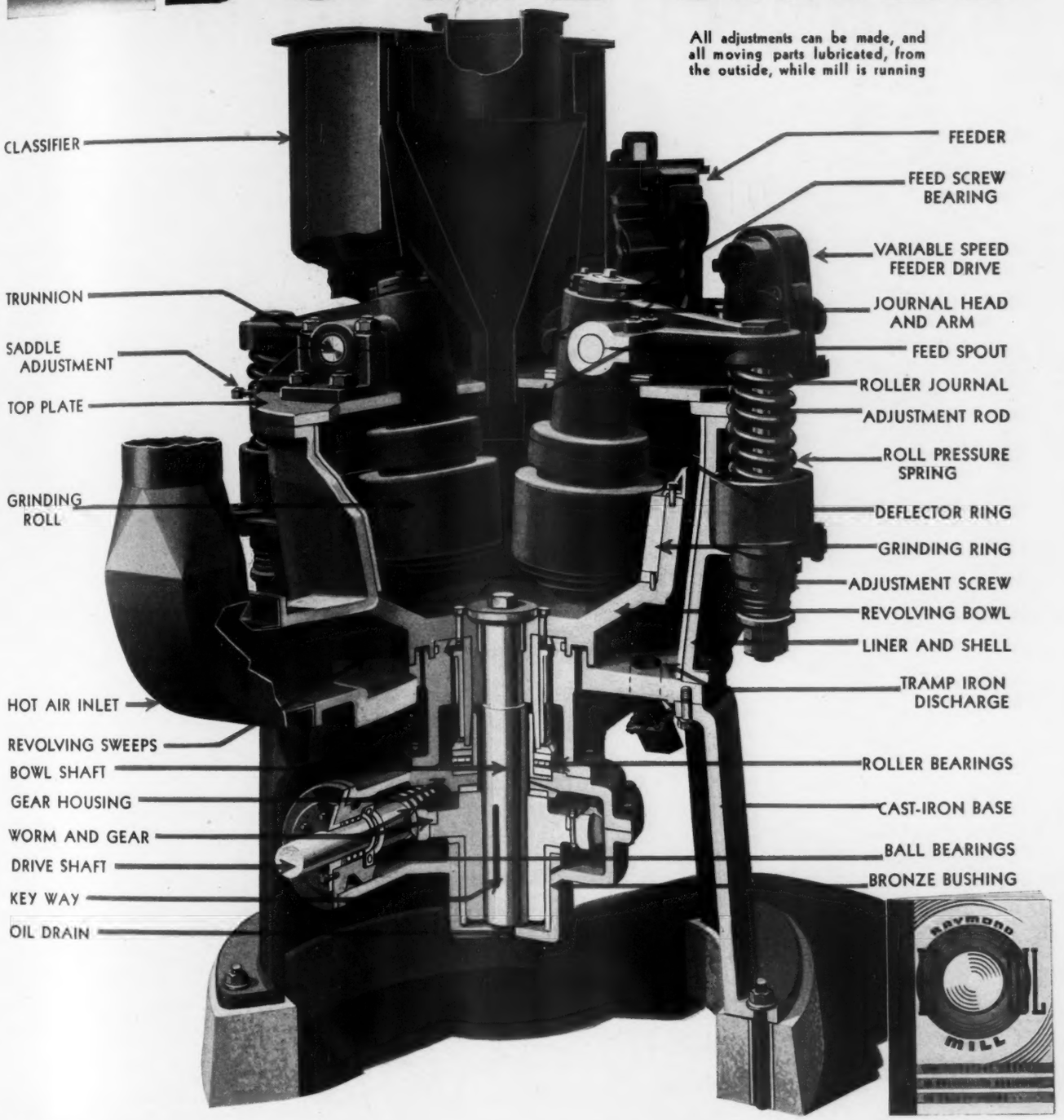
All adjustments can be made, and all moving parts lubricated, from the outside, while mill is running



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BULLETIN ON REQUEST

PULVERIZER COMPANY

Division of Combustion Engineering Company, Inc.

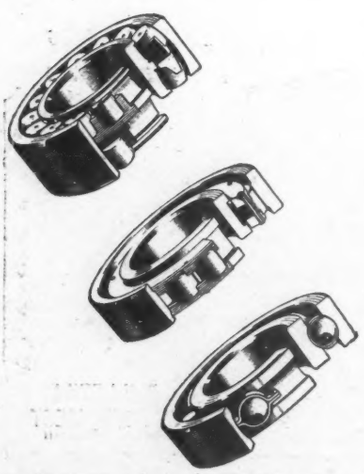
Canadian Representatives: Combustion Engineering Corporation, Ltd., Montreal

SKF *Ball Bearings*

CRUSH FRICTION COSTS

On Crusher Shafts

SKF makes practically *all types of anti-friction bearings.* When SKF recommends a particular type of bearing, therefore, you may depend upon it; its recommendations are *unbiased!*



SKF
BALL AND ROLLER BEARINGS

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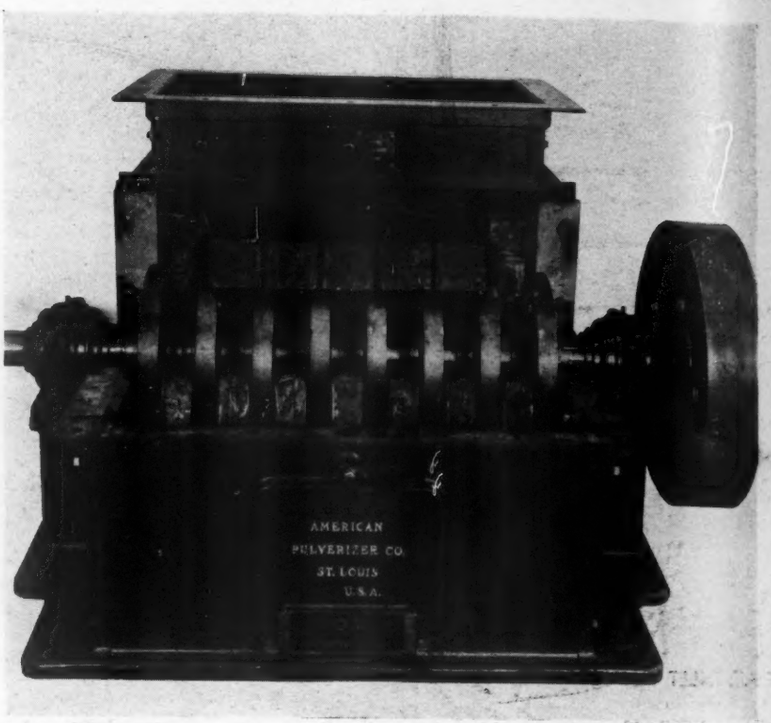


SKF-EQUIPPED **BUILT BY AMERICAN PULVERIZER CO.**

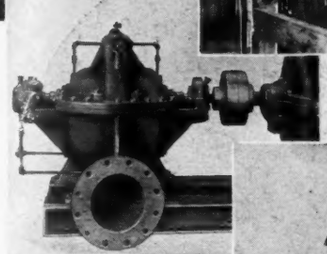
The thing that American like about SKF Ball Bearings is the way in which they help crush friction costs on this high speed roll crusher. For the main shaft runs smoothly on SKF Bearings mounted in dust-tight, self-aligning SKF Pillow Blocks bolted to lower housing pedestals.

American demand bearing economy at speeds up to 3500 R.P.M., motor driven, and 5000 R.P.M., belt driven. By specifying SKF, they get bearings easy to install, easily accessible, and, above all, that require very little attention. Their product is another good example of SKF adaptability to the rock products field. You can crush operating costs, too. Merely insist upon SKF for all rotating parts.

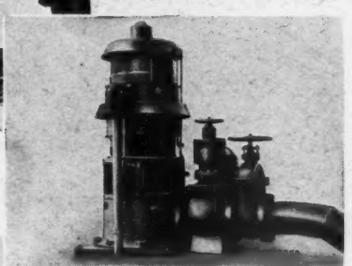
SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.

WORTHINGTON at Grand Coulee

One of more than 50 Worthington Multi-V-Drives operating the big Jeffrey Conveyor System

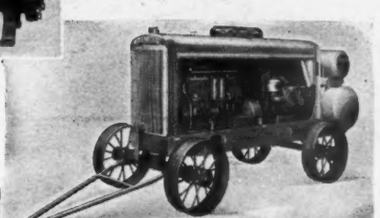


Large Centrifugal Pump for the gravel washers

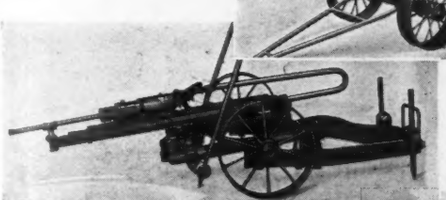


Cofferdam Dewatering Pump

Numerous small Steam Pumps are providing a variety of general services



Portable Compressor for the Rock Drilling Equipment



The time-saving Rockmaster

The Drifter, an outstanding performer

A few examples from an extensive equipment list . . . indicative of the scope of Worthington service at Grand Coulee

WORTHINGTON Multi-V-Belt Drives . . . totaling more than 7,000 horsepower . . . driving the giant Jeffrey Conveyor System • Worthington Vertical Turbine Type Cofferdam Dewatering Pumps • big Worthington Centrifugal Pumps for the gravel washers • Worthington Rock Drilling Equipment and Portable Air Compressors • and a further list of smaller pumps for a variety of important services • are contributing to the splendid records being set by Mason-Walsh-Atkinson-Kier, the general contractors at Grand Coulee.

Worthington is proud of this one more notable example of the wide scope of its service to the largest . . . and down to the smallest . . . construction jobs everywhere.

A-3583

WORTHINGTON PUMP AND MACHINERY CORPORATION

ATLANTA BOSTON BUFFALO CHICAGO — CINCINNATI CLEVELAND DALLAS DENVER — DETROIT EL PASO HOUSTON KANSAS CITY

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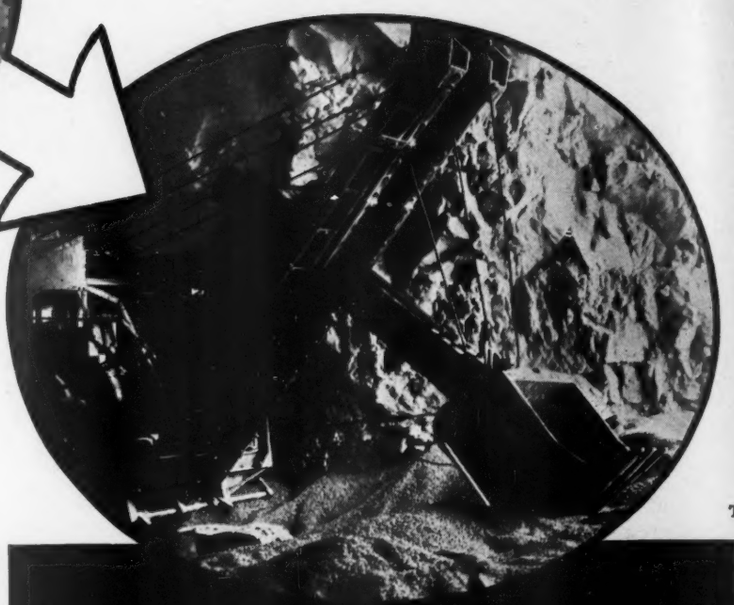


T-14

Only when wire comes within the narrow tolerance of our rigid specifications, is it permitted to go into any Broderick & Bascom Wire Rope.

The qualifications for use in Yellow Strand are particularly high because this celebrated rope is intended for duty where conditions are unusually severe.

"Flex-Set" Preformed Yellow Strand is made of this same high quality wire.

The difference is this: each strand is pre-shaped to the helical form it will maintain in the finished rope.

Result: a rope that is virtually pre-broken in, flexible, easy to handle and install, with little tendency to kink or fatigue.

For long, satisfactory, economical service, use "Flex-Set" Preformed Yellow Strand.

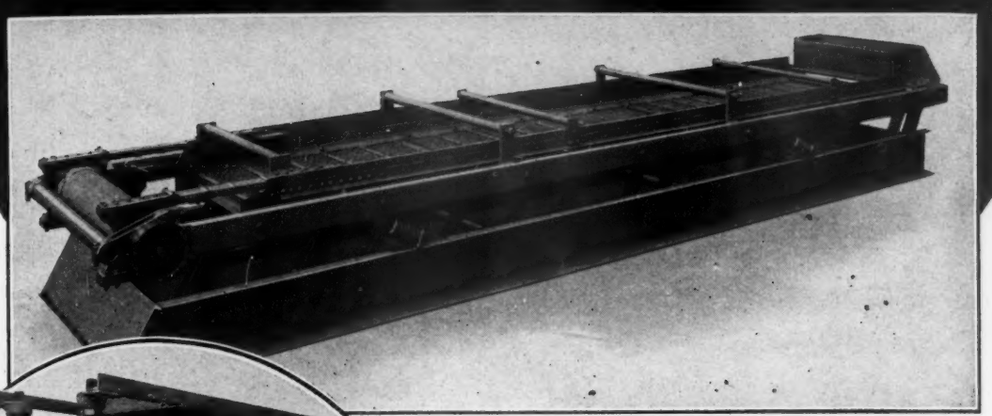
Broderick & Bascom Rope Co.
St. Louis

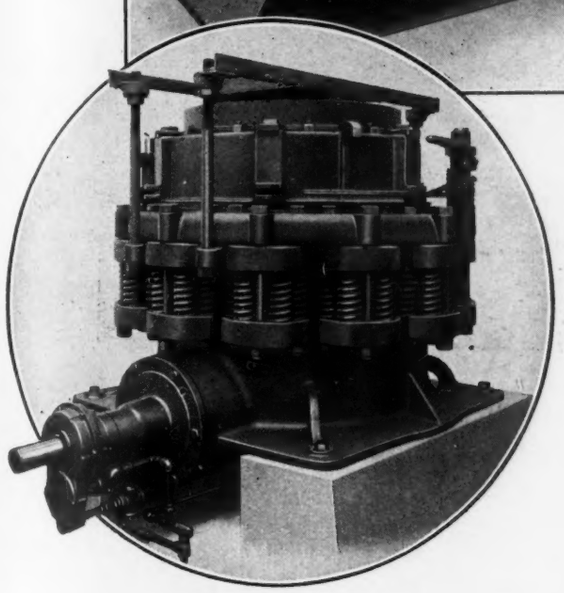
Factories: St. Louis and Seattle

Branches:
New York - Seattle - Portland - Houston

"Flex-Set" Preformed YELLOW STRAND

SYMONS CRUSHERS AND SCREENS





Better Materials at Lower Cost

• • • •

Here is the combination that will produce them

The Symons Cone Crusher was developed to meet the demand for finer crushed materials produced in quantity at lower cost. Today, because of its widespread use among the leading producers of such materials, it has become recognized as standard equipment for modern crushing plants. If fine crushing is desired, Symons Cones will do it.

Now that better screening is required, this need is filled by the Symons Screen. Here is a screen that sets level, it has an entirely different screening action and its performance is such that the most rigid specifications can be met. By using Symons Crushers and Screens, better quality of materials can be secured and at a cost that will reflect in greater profits.

For further information on Screens and Crushers write for Bulletins KR65 and KR66.

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"Everything is running all right"

What would be the cost to industry if plant owners always took their operators seriously who say "Everything is running all right?"

You want your machinery to give you quantity production of high quality at low cost. You expect there will be little need for replacements, repairs, maintenance. Yet friction and wear are unseen. They are always at work. They menace production, eat into profits.

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Almost any oil will allow your machinery to function. But if that oil is not specifically right for the job it has to do, increased power costs, rising maintenance expense, interruptions to operation and excessive costs for plant lubrication are the inevitable penalties.

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Lubrication often gets but slight attention because its cost is so small. If oil cost $10 a quart instead of a few cents, many executives would make certain that the lubricants they used were exactly suited to their machinery requirements and plant operating conditions.

A Way to Curb Tomorrow's Costs Today

Often it is in plants where — "Everything is running all right" — that Texaco *tested* Lubricants and Texaco's technical staff will be most effective. There is ample proof of this in the records available through one of our representatives.

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Address all Communications to the Company

April 29, 1935

Lima Locomotive Works, Inc.
Lima, Ohio

Attention: Mr. Henry Barnhart

Gentlemen:

We wish to take this opportunity to express our sincere appreciation of the many favors extended us in connection with our negotiations, and the keen interest you have shown in our operations in connection with the building of the Spillway.

We are exceedingly pleased with the performance records of the 701 LIMA shovels purchased for this work. These machines have more than fulfilled our every expectation. We will be pleased indeed to recommend the LIMA to any prospective purchaser.

Yours very truly,

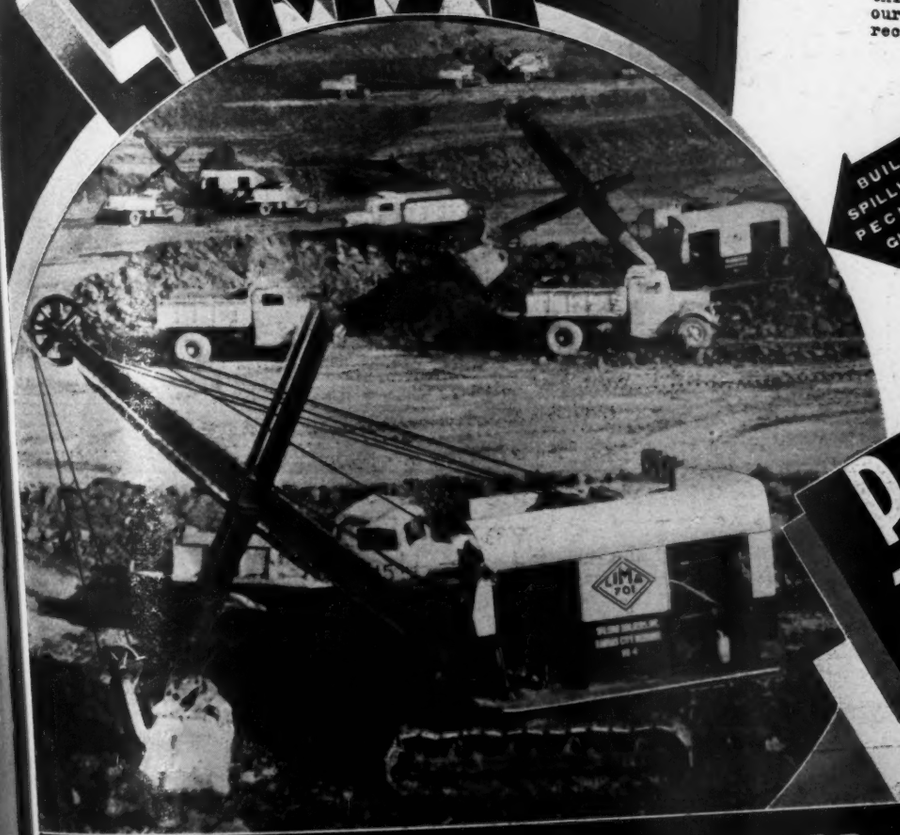
SPILLWAY BUILDERS, INC.

By H. J. Massman
H. J. Massman
President

BUILDING THE SPILLWAY AT FORT PECK DAM NEAR GLASGOW, MONT.

RECORD
LIMA

LIMA



PAGES from the RECOR
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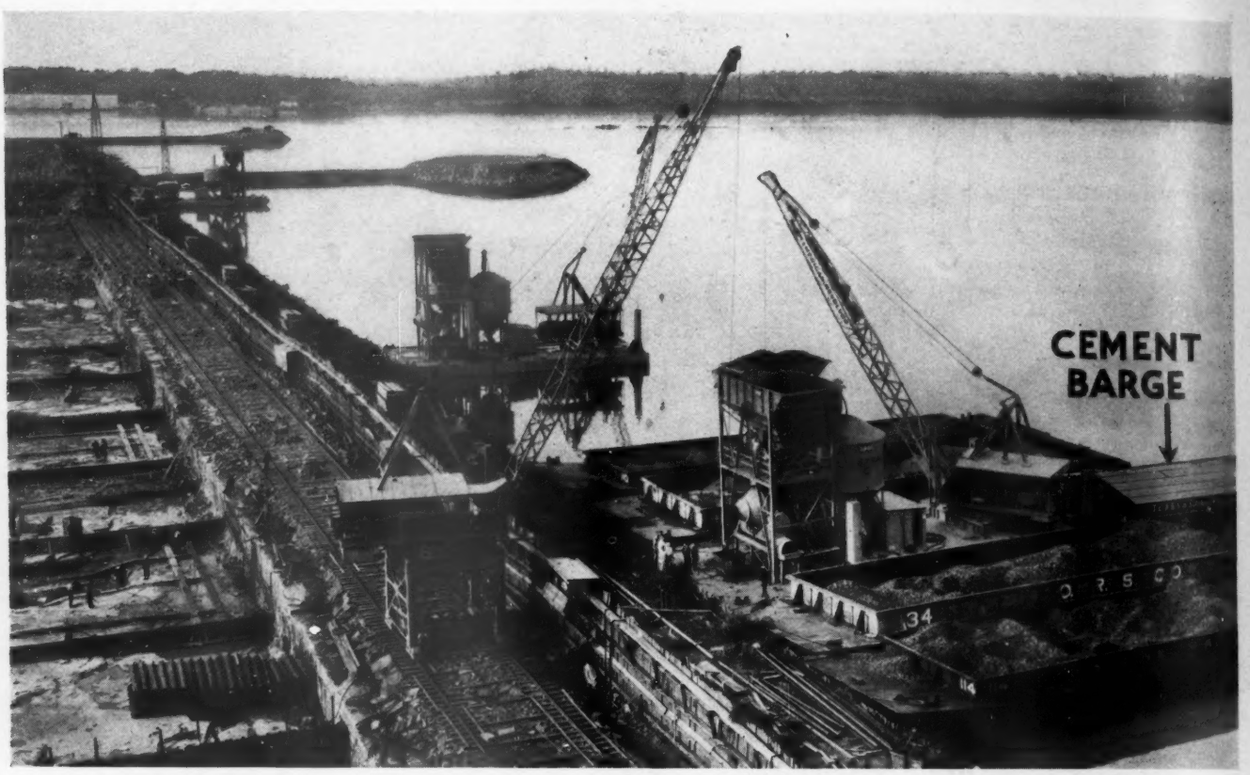
OBTAIN THESE SAVINGS IN PLACING CONCRETE



When completed, Wheeler Dam will be over a mile long. Floating mixing plants offered the simplest and most practical means to mix and place concrete for a dam of this size. Three of the four mixing plants are shown above. Each is served by one Portable Fuller-Kinyon Pump. Fuller-Kinyon Pumps are the only conveyors capable of unloading barges. Note how the cement barge is located to avoid interference with the handling of aggregates. Another pump handles cement for the Lock, which will be seen at the upper left of the illustration.

FLEXIBILITY - SPEED - RELIABILITY - LOW COST

Fuller-Kinyon Portable Cement Pumps are the only conveyors capable of handling cement under all plant conditions. They unload box cars and barges and recover cement from simple storage sheds with equal facility. For additional information on the advantages of these conveyors write for our bulletin.

Many millions of barrels of bulk cement have been handled by Portable Fuller-Kinyon Pumps in building the World's greatest concrete structures. They have proved that the design and arrangement of concrete mixing plants may be based solely upon economy and convenience in handling aggregates and placing concrete, by eliminating the necessity for straight line and short distance cement conveying. As at Wheeler Dam, they have permitted the economical use of bulk cement where it would otherwise be impractical Their capacity and rapid movement, under their own power, have assisted in establishing new records in the placing of concrete, as at Norris Dam where only two pumps were required to unload cement from box cars.

Fuller Company
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THE TIME FOR "DIAGNOSIS"

. . is before the rope is used

"HOPE" may rhyme with "rope"—but all the "hope" in the world can't make the "wrong" rope do a particular job right. It's safer—and more economical—to leave "hope" to the "second-guessers"—to choose the wire rope that's "prescription-made"—from type to grade—to do the particular job it's been built for. Such a rope is American Steel & Wire Company Tiger Brand Wire Rope—backed by more than a century of experience—the rope that out-performs all other brands—insuring steadier operating output with less time out for repairs—providing a tested type and size wire rope for every specific operating condition. Wherever shovels dip, derricks swing and cranes lift—wherever wire rope carries on reliably—you'll find Tiger Brand—the largest selling wire rope in the world—putting dependability on the job.

Tiger Brand Wire Rope is available in Standard (non-preformed) or Excellay (preformed) constructions.

Use Tiger Wire Rope Clips—identified by their yellow base.

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Style "B" Newhouse Crusher

FOR GREATER PRODUCTION

and uniform product

NEWHOUSE Crushers, with their short rapid crushing action, meet the industry's requirements for large capacities, high reduction, and uniform product. The large unobstructed receiving openings permit easy feeding. The drive is direct by an electric motor mounted above the crusher spider. There are few working parts, all readily accessible, and no gears or belts.

Reversible, non-choking concaves are furnished as standard equipment except for small feed and fine product. A new type of dust seal positively prevents leakage of oil and prevents dust or water from entering the eccentric bearing.

This crusher unlike all others does not require an expensive permanent foundation. It is suspended from the plant structure by means of three cables that not only support the crusher, but also absorb the vibration and shock of crushing and prevent it from being transmitted to the supporting structure.

We would like to show you operating records of these modern crushers and how they have saved money in many crushing and mining plants. Get in touch with the nearest Allis-Chalmers office.

ALLIS-CHALMERS

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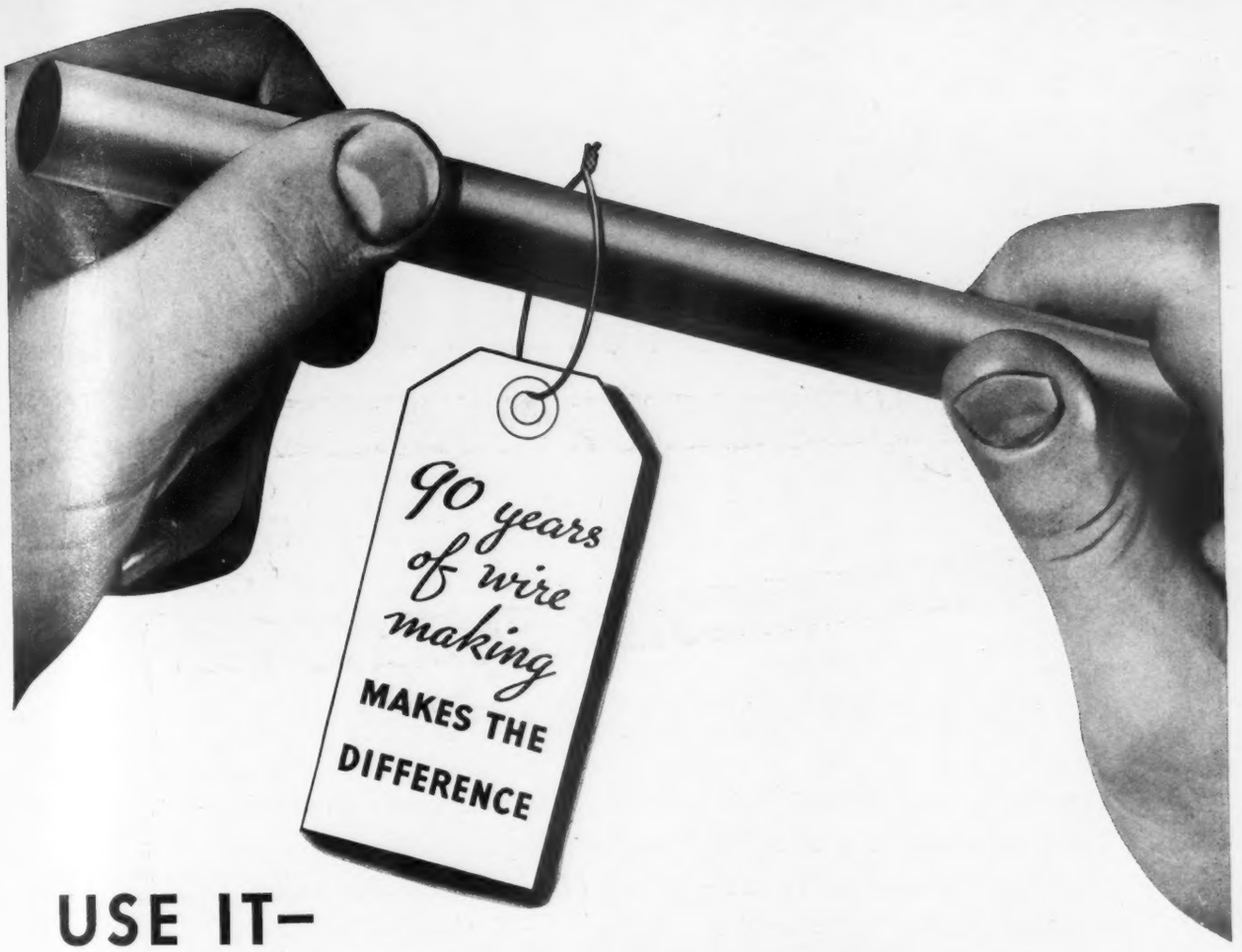
Rock Products reaches more plants than any other paper



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to lower your Screening Costs!

Wire is the very "backbone" of any wire screen. In other words, a screen is just as good as...no better than ...the wire of which it is made.

To help you solve your screening problems... to help you lower your screening costs... Roebling offers you the benefit of 90 years of wire making experience.

Let us cooperate with you. Our screens are available for sizing, cleaning, and grading purposes... in many types and metals to meet a wide range of efficiency, vibration, and abrasion requirements.

We would be very glad to receive your request for further data, prices, samples... or a copy of our new Wire Screen Catalog.

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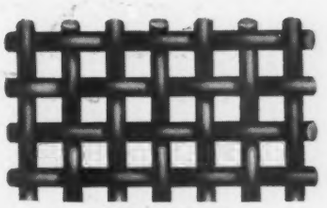
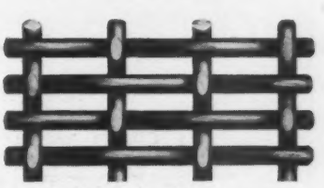


Square Mesh Wire Screen

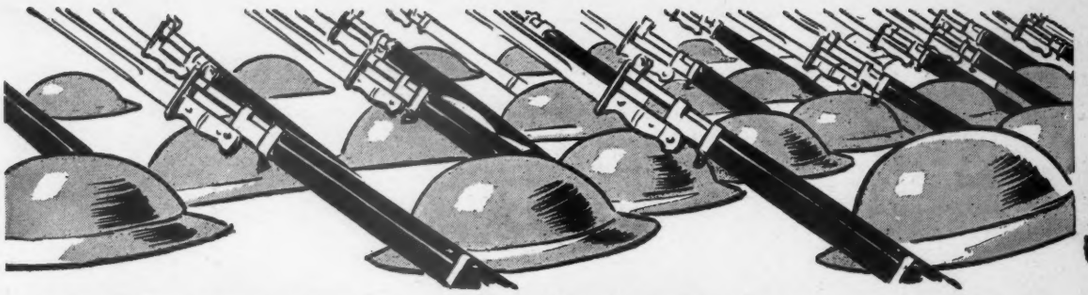


Oblong Mesh Wire Screen

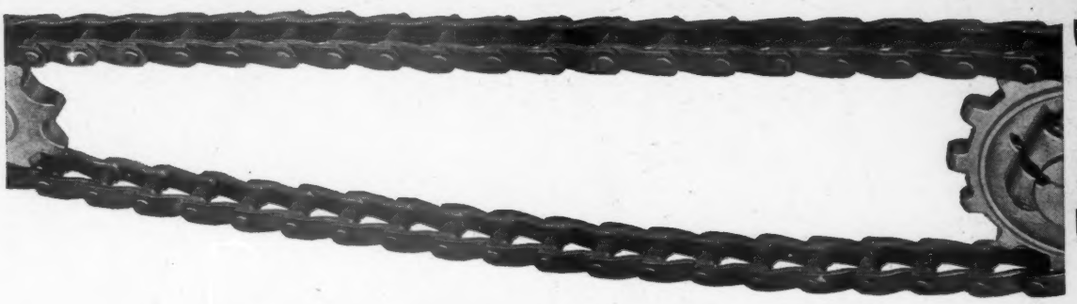
ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING – MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY



THEIR STRENGTH



IS THE STRENGTH OF STEEL . . .

Rex Chabelco All-Steel Drive Chain is made in a complete line from 1-inch to 6-inch pitch—for every type of drive requirement.

In this line you will find the strength, the precision and the finish to meet every drive condition. All are built on the Rex Unit Link principle that means a chain that will be long lasting in the field—or in the plant.

If Chain were a new invention . . .

If chain were a new invention many new ways would probably be found for applying it—many new opportunities for economies and for improvements in many types of drives—in plants and on machinery—for its flexibility and range are almost unlimited.

Application Engineers of the Chain Belt Company are always available to help work out any drive or conveyor problems, with a complete line of standard and special Rex Roller Chains, 3/8 to 2½-inch pitch and 270 standard Rex Chabelco Steel Chains or any Special Chain the service may require.

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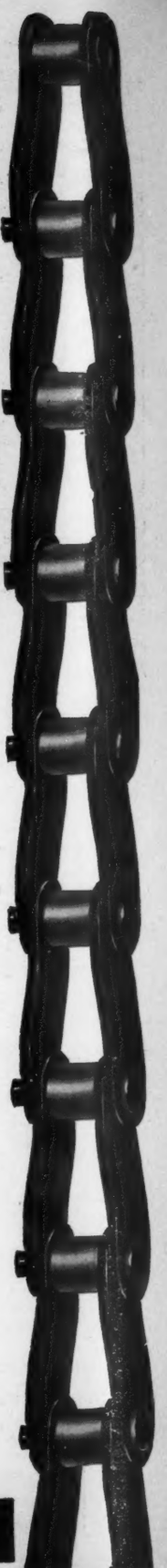

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REX CHAIN FOR EVERY DRIVE AND CONVEYOR

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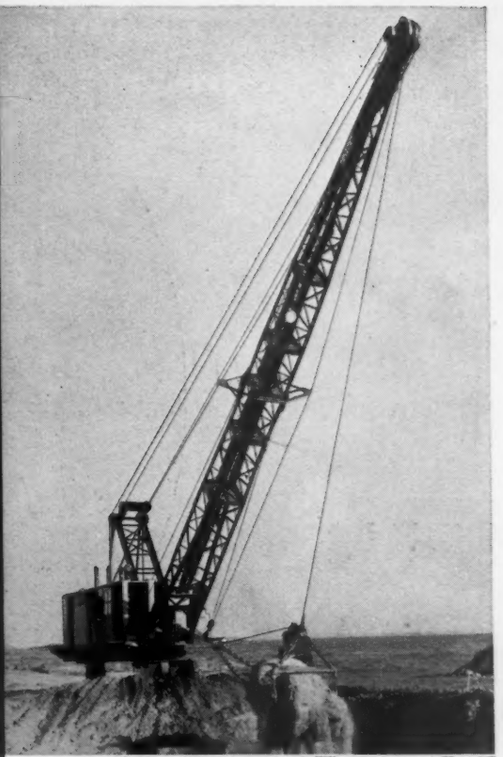
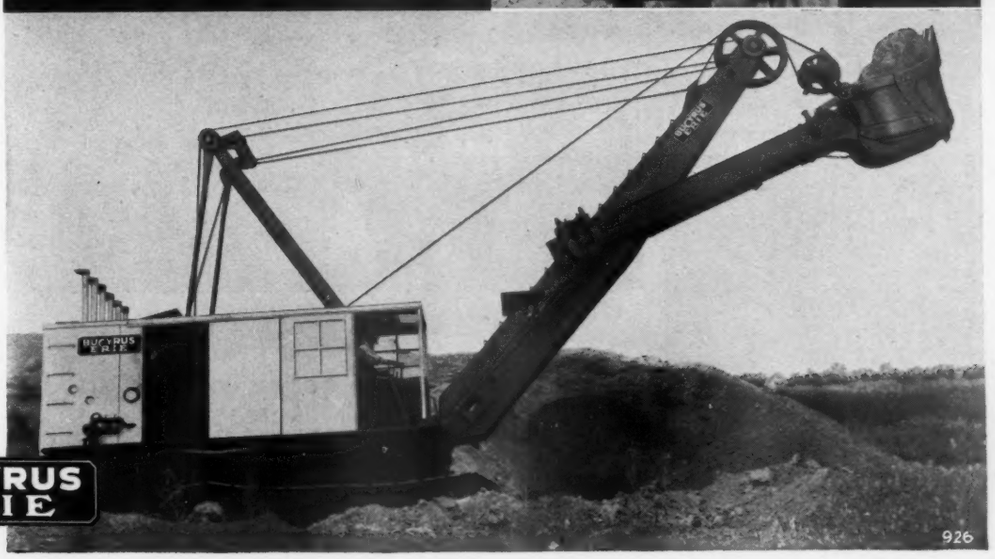
2½-yard Diesel ever built the NEW 55-B





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YOU get something new in modern earning-ability in the Bucyrus-Erie 55-B Diesel because this interesting 2½-yard excavator combines new output-ability, convert-ability, move-ability and ship-ability with Bucyrus-Erie's famous depend-ability. Find out about this able machine that means more profits for owners. It's the huskiest, fastest Diesel shovel-dragline-crane in anywhere near its size-class. Send for the 55-B bulletin.

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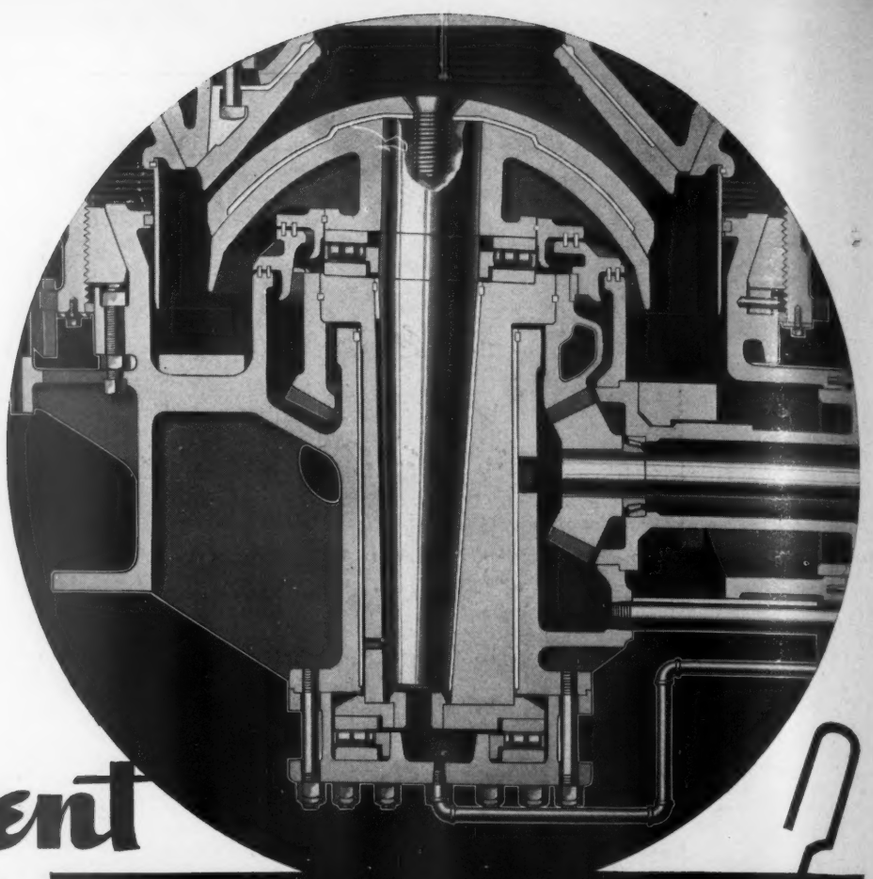
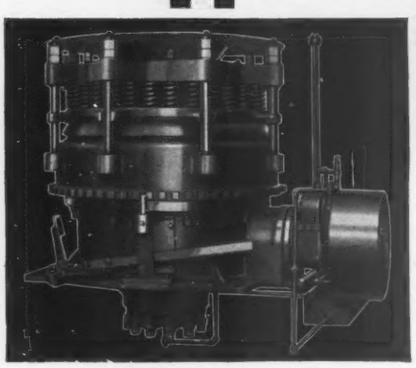


WHAT'S Different ABOUT THE TELSMITH GYRASPHERE



The spherical head and corresponding concave (shown above) are adapted from the first crusher devised by primitive man—the mortar and pestle. The parts are inverted to facilitate discharge; but the crushing action is the same. Particles are caught and broken between two multi-curved surfaces, causing an ideal cubing action. The same mechanism that ground corn meal in ancient Egypt now produces an improved cubical aggregate in modern mines and quarries. *Write* for Bulletin Y-11.

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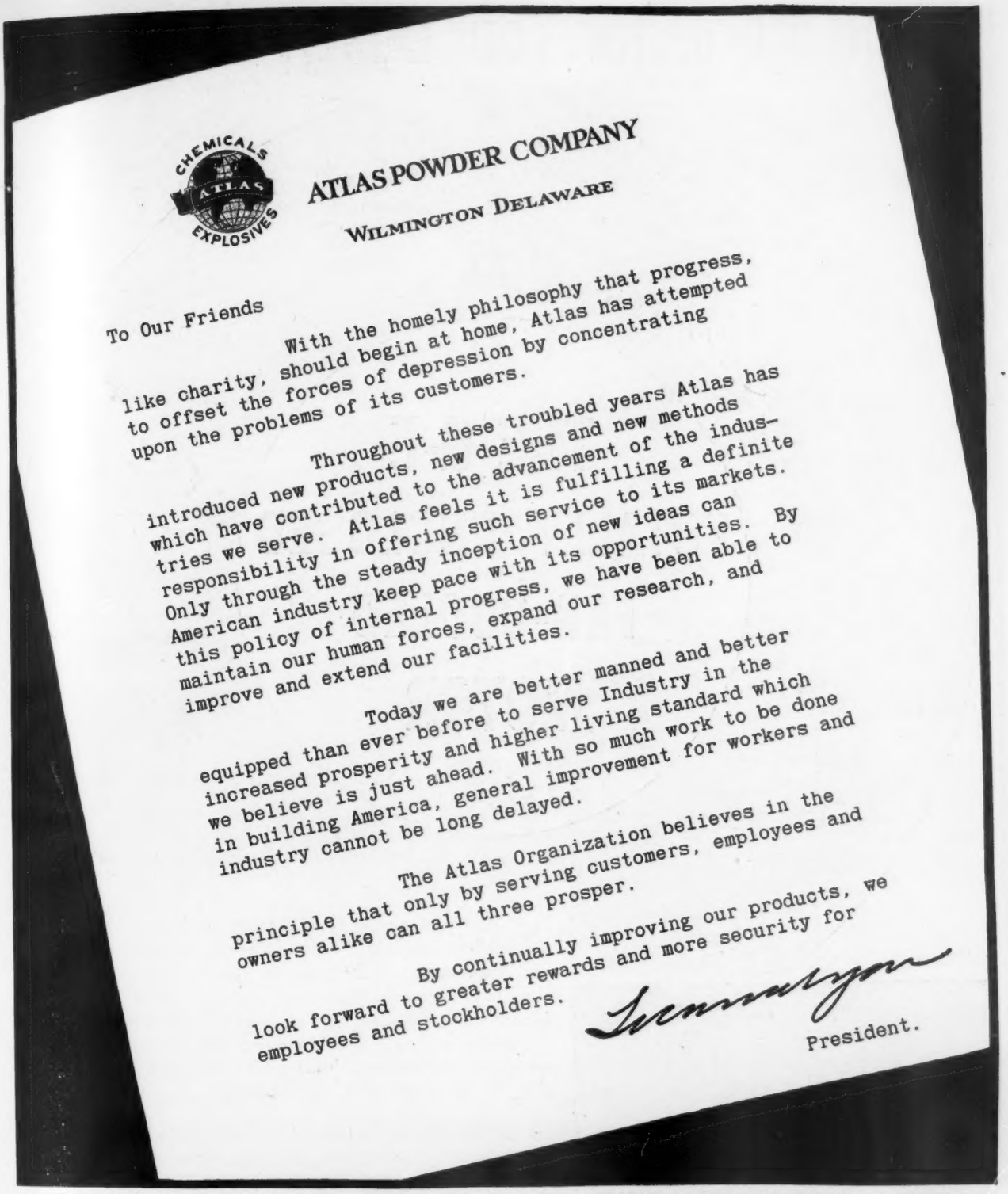
TELSMITH

Y-6



ATLAS POWDER COMPANY

WILMINGTON DELAWARE

To Our Friends

With the homely philosophy that progress, like charity, should begin at home, Atlas has attempted to offset the forces of depression by concentrating upon the problems of its customers.

Throughout these troubled years Atlas has introduced new products, new designs and new methods which have contributed to the advancement of the industries we serve. Atlas feels it is fulfilling a definite responsibility in offering such service to its markets. Only through the steady inception of new ideas can American industry keep pace with its opportunities. By this policy of internal progress, we have been able to maintain our human forces, expand our research, and improve and extend our facilities.

Today we are better manned and better equipped than ever before to serve Industry in the increased prosperity and higher living standard which we believe is just ahead. With so much work to be done in building America, general improvement for workers and industry cannot be long delayed.

The Atlas Organization believes in the principle that only by serving customers, employees and owners alike can all three prosper.

By continually improving our products, we look forward to greater rewards and more security for employees and stockholders.

President.

ATLAS POWDER COMPANY, WILMINGTON, DEL.

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High Explosives	Zapon Lacquers,	Activated	Chemicals
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Which Motor for Your Dusty, Dirty Jobs?

Synchronous motors for constant-speed loads, where you want high efficiency and power-factor improvement
Direct-current motors—Use them where you want unusually fine speed control, or where your power is direct current
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THE G-E TOTALLY ENCLOSED FAN-COOLED MOTOR

YOU can save money and obtain more dependable service by using low-upkeep G-E totally enclosed, fan-cooled motors* and dust-tight control for your jobs in dusty, dirty places and outdoor installations—jobs that would put open motors out of business in short order. Whatever type of motor your job requires—squirrel-cage induction, wound-rotor induction, synchronous, direct-current—we can supply you with the RIGHT motor, protected against dust, dirt, mild chemicals, and moisture.

Look around your plant—perhaps open motors are now being used where G-E totally enclosed, fan-cooled motors would cut maintenance costs and prevent frequent interruptions of production. A sales engineer in the nearest G-E office will gladly help you find the most profitable solution of your drive problems. General Electric, Schenectady, N. Y.

**These motors can be furnished with Underwriters' label indicating their suitability for Class I, Group D, hazardous gas locations, or Class II, Group G, hazardous dust locations.*

020-104

GENERAL ELECTRIC

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII Chicago, September, 1935 Number 10

Recovery Progress—Trends—Editorial Comment

INDUSTRY does not appear to be as much perturbed by the accomplishments of the 74th Congress of the United States as it ought to be, for taken all together these legislative acts are ample proof of a genuine industrial and social revolution. The National Labor Relations Act, the Social Security Act, the Motor Carrier Act, the Guffey Coal Control Act—to mention only a few—will, if carried out, affect the business of every one in the United States. True that Senator Long's filibuster, which prevented adoption of a deficiency bill appropriating about one hundred million dollars, will delay putting some of this new legislation into effect, but it is on the statute books of the nation, and the President may find a way around constitutional limitations designed to prevent spending money for a purpose not specifically provided for by Congress.

The composure, complacency, or apathy, of industry in the face of this avalanche of revolutionary legislation may be caused by any number of things. One probably is that few business men have had an opportunity to read these new laws, few certainly have had a chance to digest them; another reason is perhaps that business expects the Supreme Court to declare most of them unconstitutional; possibly another reason is that some business men consider themselves in the midst of a bad dream, and that by the end of another year the good people of the United States will have cleared away the mist and a wiser Congress and a more stable President-elect will be preparing to discard much that this Congress has done under duress of the President.

One will find that there is mighty little in any of this new legislation which could be considered helpful to the conduct of business as we have known it in times past. The new laws will tremendously complicate the conduct of all business with many new rules, regulations and new taxes and responsibilities. The Guffey Coal Control Act, heralded as the new little NRA, puts the coal industry under complete federal regulation, and is generally looked upon as the opening wedge for similar regulation of other basic industries—if it passes a Supreme Court test.

Whether much of this revolutionary legislation is rendered void by subsequent Supreme Court decisions or not, the passage of these acts and the impetus to "reformation" of business and industry that they represent are sure to have a profound effect on all industry and business in the future. To pin hopes of a return to the "good old days" on such possible Supreme Court decisions, or to a change in the political complexion of the government, seems most certain to prove futile. It is safer to assume that the passage of all this legislation is more a symptom of a real urge on the part of society for a change than a cause of such change. The President has led because he has symbolized and capitalized a deep-rooted and widespread desire for fundamental changes.

Such movements, or reforms, or progress, always go forward in great surges which take the majority of society farther than it really anticipated, or really desired, and are followed by a swing of the pendulum in the opposite direction; but we never get back quite to the place we started from. There have to be permanent readjustments; those will succeed who learn to adapt themselves quickest and best to the new philosophy of industry and business. That new philosophy is largely centered about a conception of industry as the hand-maiden of all the people, rather than of a few who have controlled and who still must control industrial activ-

Boulder dam, just about completed, 'way ahead of schedule. A few more like it would keep the cement industry alive

Acme photo

ity. In other words, industry in some way must be made to support all the people, whether they work or not, in comfort if not in luxury. And however altruistic or impractical this may appear to owners and managers of industry, that is the purpose of all this new legislation, and the purpose, modified as it probably will be later by common sense and conservatism, is something that is going to persist.

Opportunity of Industrial and Trade Associations

Because of the failure of NIRA to pass a constitutional test, right now industry and business are thrown back on their own resources to retard or aid a movement of great significance. Certain it is, too, that fresh attempts will be made to bring about some form of industrial collectivism by law, of which the Guffey Act is probably a sample. Business and industry need not wait for the government to write its own bill; they could utilize to the utmost their voluntary trade and industrial associations—build them up, so that they may speak with the authority of a united industry when the time comes. Through those trade and industrial associations some kind of a genuine Permanent Congress of American Industry could be provided for, far more representative than the Chamber of Commerce of the United States or the National Association of Manufacturers.

Such a congress of industry could be integrated into subdivisions or committees of industries in related lines, such for example as a construction material producers' and manufacturers' division. Its members should not be merely prominent men who have little authority to speak for any one but themselves, as has been the case with the Chamber of Commerce of the United States, which has largely discounted its efforts. The members of the congress should be duly elected and instructed delegates from the trade and industrial associations, and they should be empowered to commit their associations to any action taken by them in this capacity. Thus industry could accept and work out a form of voluntary or democratic industrial collectivism, rather than have governmental or autocratic collectivism forced upon it.

Obviously the greatest opportunity of trade and industrial associations in their history is at hand, *if* men of industry will only face the future fearlessly rather than look back on the "good old days." It will not be enough for these associations to be research and promotional organizations only. They must provide leadership in labor relations and in political economy. Most of all, they must help to educate their members in this new philosophy of business and industry. Of course, all this is rather hackneyed by much repetition, but the wind up of Congress in such a bewildering stew of new and revolutionary legislation should serve to emphasize all that has been said before.

Most of the popular and business press lays emphasis on the adjournment of Congress as a breathing spell it gives industry and business. But more than a breathing spell is needed. It should be a preparation for battle to save the last remnants of our American institution of business and industrial freedom and private management. But it can't be done by moss-back industrial leaders, self-styled, who see no out but a return to the brand of "conservatism" of the good old days. We must build on a new philosophy which admits that at least some of the objectives of the New Deal are laudable and can be and must be attained in some degree by practical business men, before they are any more seriously warped and distorted into communism or fascism by very impractical men in government.

The New Deal started out with a fair measure of sympathy and understanding on the part of business and industry; but nearly all this has disappeared because of the disgust of industry over so many absurd acts and thoughts expressed in Washington, and so little real understanding there of the viewpoint of industry, and still less attempt to cultivate the help of men of industry in accomplishing the things that can not be accomplished without their help, except by actual violence. That was shortsightedness on the part of the administration, but it would be just as shortsighted for industry to think it can set back the clock by a change in the administration, or by some saving decisions of the United States Supreme Court.

Men of industry and commerce have always been important factors in directing, interpreting and utilizing the course of events in this industrial nation, and the people of this country have always trusted their judgment and leadership above that of politicians, and they will again when and if men of industry change their business philosophy to one more in sympathy with present times and conditions. The swing of the pendulum that we see coming will find the people crying for business brains and leadership to rescue them from the chaos that politicians have made of our vast and intricate industrial machine, but let us have, when that time comes, men of business with a different if not new philosophy, so that the next revolutionary swing of the pendulum will be better controlled—more intelligently controlled—that our cherished institutions may be placed in less danger than they are today.

Organization of Mineral Aggregates Institute Progresses

THE BOARD OF DIRECTORS of the Mineral Aggregates Institute met in Washington, D. C., on July 30 and again on August 20. A third meeting is to be held on September 5. The board is now duly organized and a subcommittee of which V. P. Ahearn is chairman is engaged in drafting the rules and regulations to govern its actions, and in preparing a plan of action. These of course must be submitted to the three component associations for approval.

In his initial official report to the industry, Otho M. Graves, president of the Institute said:

"It was recognized by the governing board that Institute is confronted with many important duties, and there was informal discussion concerning several problems of the three industries in question as to which there is a unity of interest and which require consolidation of effort for the most effective results. After these subjects were thoroughly explored and agreement had been reached concerning the proper outlines of the rules and regulations of the Institute, the president was authorized to appoint subcommittees to draft rules and regulations and to survey the field of common problems of the three industries.

"While it is recognized by the governing

board that the public works program of the Federal Government necessarily causes an unusual degree of interest in national affairs on the part of the three industries, it was generally agreed that perhaps one problem is of transcendental importance, this being the constant encroachment by divisions and subdivisions of government on private operations in the production of mineral aggregates. Data already available disclose that governmental production of the materials of the industries has reached such proportions in many parts of the United States as to threaten the continued existence of privately owned plants, and it is indicated that present policies of governmental agencies may provoke still further expansion of plants owned and operated by public agencies. This is cited only as an illustration of the type of problems of the industries which necessitate a pooling of forces under the auspices of the Institute."

Construction Machinery Manufacturers Again Organizing

ON July 17, a group of manufacturers in the construction equipment industry met with the coördinating committee of the Associated Equipment Distributors in Chicago. At the meeting a plan was proposed to organize an association composed of members of existing trade associations and groups of manufacturers in the industry, for the purpose of preventing a relapse to the conditions that existed in the industry during the years immediately preceding 1934.

The following organization committee was chosen: Chairman, S. F. Beatty, Austin-Western Road Machinery Co.; Morgan Butler, Butler Bin Co.; C. L. Dunham, Sullivan Machinery Co.; George M. Etnyre, E. D. Etnyre Co.; W. B. Greene, Barber-Greene Co.; O. G. Mandt, Jaeger Machine Co.; J. R. McGiffert, Clyde Iron Works; Wm. Parrish, International Harvester Co.; L. W. Yerk, Pioneer Gravel Equipment Manufacturing Co.

The plan of organization is of general interest as the same scheme might be used by rock products producers and manufacturers.

(1) To establish an association which is in effect a federation of trade associations and groups of manufacturers of construction equipment, through which action may be taken to express the majority opinion of the members of the construction equipment industry in all matters where it is necessary or desirable for the industry to make itself heard, and to afford means by which the industry may take defensive or offensive action in its interests whenever necessary.

(2) To set up fair methods of competition as far as laws will permit, which are fundamental and applicable in all parts of the industry but which do not conflict with fair trade practices approved by an existing trade association or organized group in the industry, and to afford a place where complaints alleging violation of such fair trade practices may be filed by members of the association or its affiliated distributors.

(3) To act in the arbitration of differences which may arise between members of the industry or its affiliates.

(4) To act as a clearing house for the interchange of credit information maintained on a voluntary basis and available to all members of the industry or its affiliates.

(5) To collect information, gather statistics, and work out analyses when required.

(6) To conduct a campaign of education among members of the industry and the affiliated distributors with the object of procuring voluntary adherence to fair methods of competition without the necessity of resorting to compulsory methods.

(7) To defend the industry and any of its component groups or affiliations from discrimination or aggression, and to encourage legislation which will tend to improve conditions in the industry, and to oppose any legislation found detrimental thereto.

(8) To coöperate in improving the relations between the manufacturers, distributors and consumers.

(9) To encourage and aid, if desired, any group of manufacturers to form their own trade association so that they may become a unit in this association.

(10) To carry on any other lawful activities in the interest of the industry.

Grand Coulee Dam Cement Bids

IT IS ESTIMATED that the Grand Coulee dam on the Columbia River, Washington-Oregon, will require 4,220,000 bbl. of portland cement—nearly as much as Boulder dam. Bids for this cement, reported by the *Pacific Coast Edition of the Wall Street Journal*, were as follows:

Firms which submitted bids for standard cement and amounts bid were:

Northwestern, Groto, Wash., $1.3796, f. o. b. mill; Superior, Concrete and Seattle, Wash., $1.3796, f. o. b. mill; Lehigh, Metaline Falls, Wash., $1.3796, f. o. b. mill; Olympic, Bellingham, Wash., $1.38, f. o. b. mill, and Beaver, Gold Hill, Ore., $1.40, f. o. b. mill; Pacific, $2.09614 at dam site.

Four of the firms submitted bids of $6.80 a ton, f. o. b. mill, on clinker. They were Northwestern, Superior, Lehigh and Olympic. Other bids were Spokane, $7.60 ton, f. o. b. mill; Beaver, $5.475, f. o. b. mill and Pacific, $15.25, f. o. b., Odair, Wash.

Low bids compare with about $1.40 f.o.b. mill, on late contracts for Boulder dam, none of which was of the unit size of the Grand Coulee call. The Pacific Northwestern market for general cement offerings up to recent date has been the highest on the Pacific Coast, running not far from $2. In San Francisco base price has been nearer $1.80, although quotations which include freight to destination have ranged well above $2.

The Los Angeles price basis has been materially upset of late and has ranged from $1.24 to $1.32 f.o.b. mill.

Only one California company, Pacific Portland Cement, entered a Coulee bid, offering cement at $3.09614 at the Government rail head near the damsite. Freight rates from Oregon and Washington mills apparently do not represent this differential of $1.716.

Under the projected work, Coulee dam builders will require 105,000 bbl. of cement in October, 130,000 in November and 125,000 in December. The schedule for the full year of 1936 is about 1,870,000 bbl. and for 1937 is a little less than 2,000,000, which will represent final deliveries on the contracts.

In comparing the present Coulee bids with the Boulder dam job, it may be recalled that some cement in the earlier stages was obtained on Government contracts as low as $1.04, subsequently rising to $1.28. After the NRA was put in effect, a general bid of $1.55 by southern mills resulted in federal attack. In the end the controversy was adjusted and cement was bought at $1.40 plus freight. Boulder contracts, however, were placed in amounts of 400,000 bbl. or less at a time.

Miscellaneous Rock Products

United States Bureau of Mines, Washington, D. C., has begun publication of a monthly, "Mineral Trade Notes," in Vol. 1, No. 1, dated July 20, 1935, of which are the following items of possible interest to ROCK PRODUCTS readers:

Barite Recovery from Drilling Mud.—The use of ground barite as a weighting material for oil-well-drilling muds is increasing. In Trinidad the spent mud is diluted and the sand settled out against a rising current of water in a suitable classifier, the overflow from which goes to a second tank where the barite settles out from the clay suspension. (Scott, G. H., Some Notes on Barytes Recovery from Mud: *Jour. Inst. Petrol. Technologists,* London, vol. 21, February, 1935, pp. 89-104.)

Ground limestone is becoming a highly technical product. The distinguishing characteristics of true chalk have never been defined fully, but for the manufacture of putty and sundry other purposes preference has been shown for certain imported materials. So-called "whiting substitute," finely pulverized limestone, has competed with chalk to some extent in the manufacture of putty and to a greater extent in cold-water paints. One of the leading uses, however, is as a constituent of stock feeds; a recent development in this field is the offering of iodized carbonate of lime, the iodine being added to the powdered limestone instead of to salt. Properly prepared limestone alone or in conjunction with precipitated chalk is employed in paper making, and it produces a coated paper with a characteristic satin finish; more extensive use in this industry, however, is handicapped, at least temporarily, by a confused patent situation. As a result of aggressive technical research, a new limestone product known as "Electro" has been placed upon the market by the Calcium Carbonate Corporation, Chicago, Ill. This product is described as a fully dispersed, free-flowing calcium carbonate and is made by a special process. It has unusual advantages for use as asphalt or rubber filler and has been recommended as an admixture for portland cement. A growing use as insecticides or insecticide carrier is also anticipated.

Flexible Quarry Operation Built Around Steel Derricks

THE WILLIAMS LIME MANUFACTURING CO., Knoxville, Tenn., has worked three individual quarries to supply lime rock. The three are adjacent to each other, and their respective floor levels are down to the better rock. The rock being taken out now is taken from the land separating the three "holes" from each other, the aim being to work this way until one large quarry will result and no overburden will remain to interfere with operations. The rock being taken out now contains considerable overburden. A 40-ft. face is being worked and the desirable stone is separated from the undesirable at the working face.

All drilling is done by Jack-hamers driven by an Ingersoll-Rand air compressor. Loading of overburden is accomplished by a Koehring 1-yd. gasoline-driven shovel, dumping into two recently added Koehring Dumptors. These Dumptors carry 5 tons and operate with equal speed backwards or forwards. Operating on a 7-ft. wheelbase, they are easily handled and are used for innumerable tasks around the quarry. The lime kilns (twelve) are located in a hollow between the hills, and the ground level of the quarry is just slightly higher in elevation than the tops of the kilns. The overburden is hauled around a road on the approximate altitude of the quarry floor and dumped over into the hollow opposite the kilns.

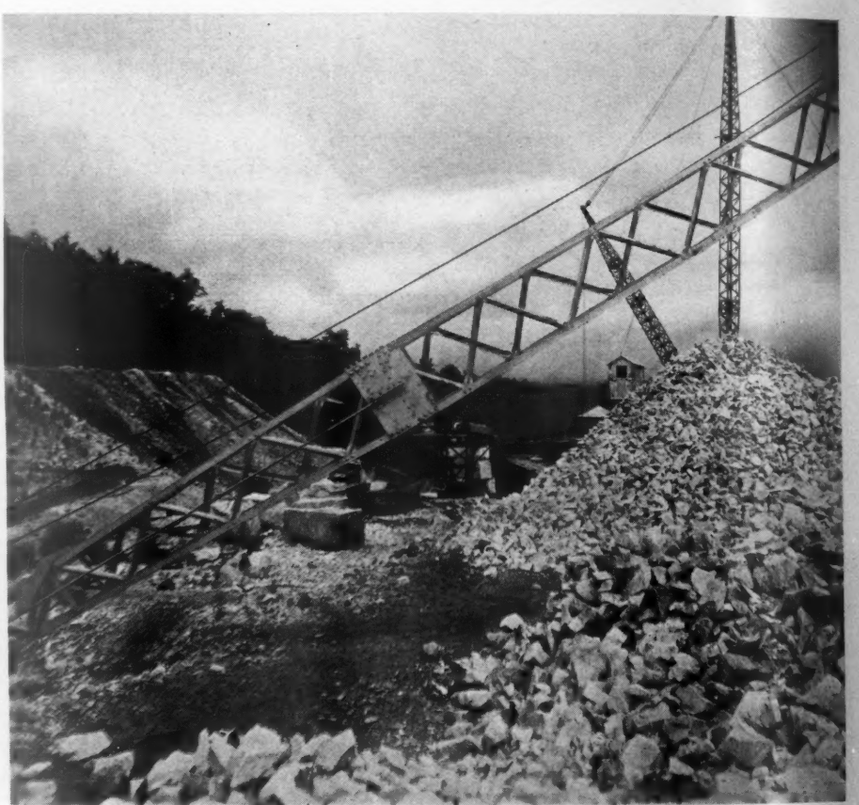
The good rock is picked out and loaded by the same shovel into the same Dumptors and is dumped into piles nearby, conveniently spaced, where they are broken down to approximately 7-in. size by men with sledges. The crusher is not being used. The hand sledging, in addition to giving work to more men than would otherwise be needed, enables greater selectivity, and a finer grade of stone is brought to the kilns. The track leading to the top of the kilns has also been discontinued, and a very novel arrangement of a truck is used, which permits great flexibility in the quarry and eliminates any double handling of rock or overburden.

The quarry is equipped with eleven steel "rock boards," or buckets, designed in such a way as to be easily handled by a truck to and from the quarry to the twin derricks stationed just above the tops of the kilns.

A 5-ton, high-powered White truck, with 2⅔ yd. or 4 tons of rock, which is the maximum that can be handled on the rear of the truck.

When the men are breaking rock, one of these buckets is stationed at each pile, so that the truck can be backed in and connected to it. The men are paid according to the number of buckets they load. As a bucket is let down by the hoist, the ring releases itself from the hook, making it unnecessary for the driver to get out of his cab.

Two steel derricks, each 115 ft. high, the one nearest the kilns (the service derrick) an A-frame construction built on its rear for hoisting is used in hauling these buckets. Two heavy 6-in. channels on the rear extend upwards nearly vertically. (The slightly sloping end of the bucket is parallel to these channels.) Support is given by 4-in. angle braces. Power take-off and drum, operating from the transmission, operate the hoist. Two ⅝-in. wire ropes pass over the sheaves and to the spreader bar. When the truck is to pick up a load, it backs up to the end with the 18-in. lever arms nearest, and a ring (one on each side) is slipped over the slotted lever arm. When power is applied, the bucket is pulled up next to the channels and raised approximately 10 in. off the ground with its bottom parallel to the ground, and it is ready to be hauled. The buckets are of ⅜-in. steel and are designed to carry having a 125-ft. boom and the other a 100-ft. boom, are placed 200 ft. apart, with their bases approximately on the quarry floor level and slightly above the tops of the kilns.



View of skip bucket just emptying into kiln at Williams Lime Manufacturing Co.

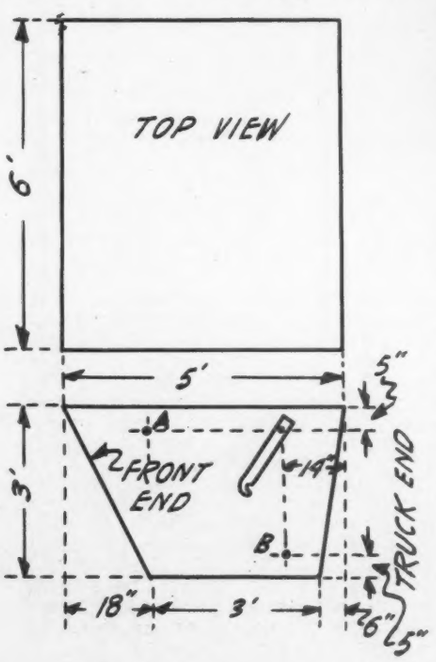
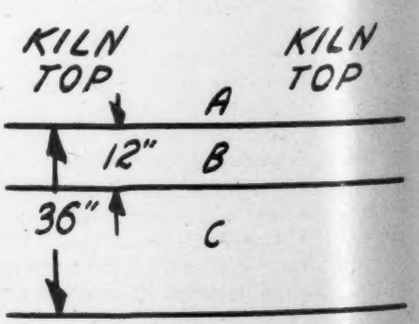
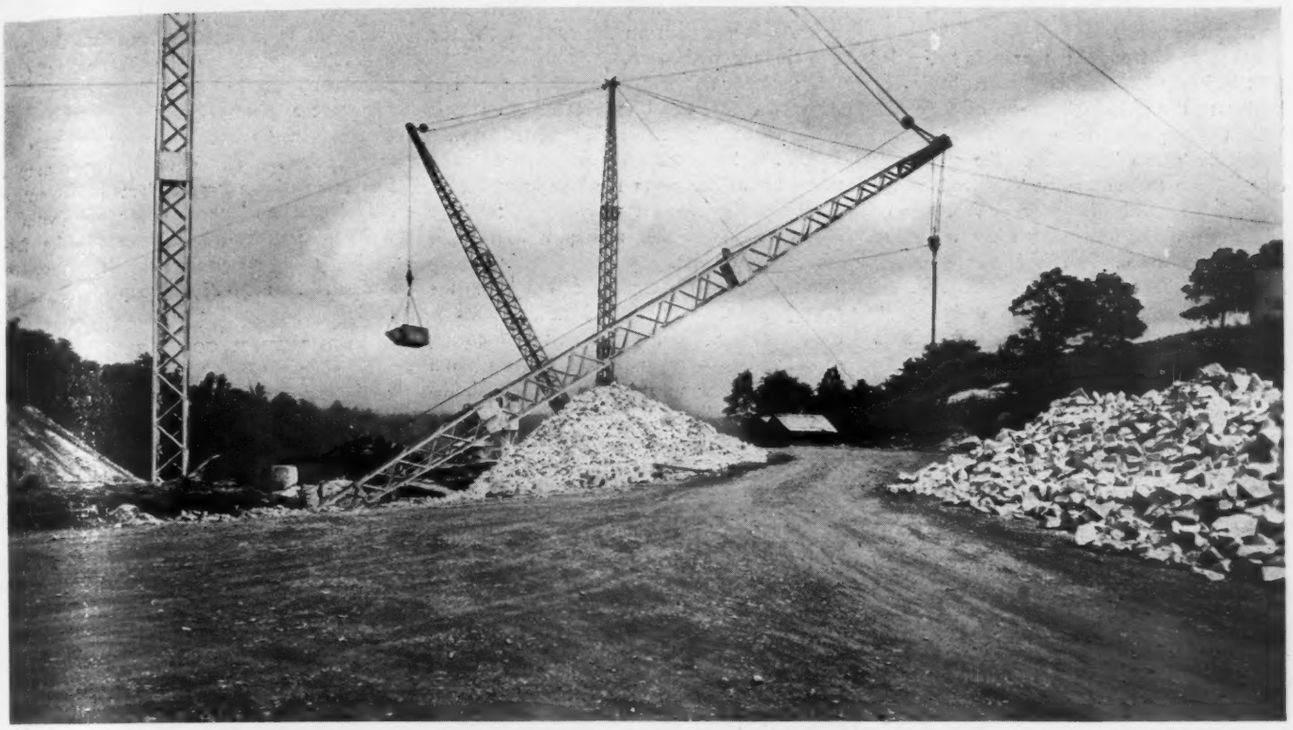


Diagram showing hook-up for "riding" bucket to kiln



Rail system used in getting bucket to kiln



Derricks used to load kilns at Williams Lime Manufacturing Co. The tops of the kilns are visible in the background, and two stock piles are at the right

General view of quarry of Williams Lime Manufacturing Co., showing buckets spaced around. The shovel is loading waste material to be hauled on the roadway, to right, and dumped. The truck has just picked up a bucket to go to the derrick near the kilns

Since they are 200 ft. apart, an interchange of rock is possible.

When rock from the quarry is to be fed to the kilns directly, the truck hauls the bucket to the end of the boom of a derrick hoist (usually the one nearest the kiln) and sets it down and brings back the previously emptied one to the quarry. The end of the boom is equipped with four chains, two of which are 7 ft. 6 in. long while the other two are 8 ft. long. The longer pair are hooked to the two hooks *B* (see sketch), and the other two are hooked to hooks *A*. When lifted, the bucket will "ride" in a tilted position.

The 36-in. gauge rails formerly used for the top of the kilns are still used, and a third one is added. A car with sheet metal siding (to keep rock from falling away) passes on rails *A* and *C* and is stopped in front of the kiln to be loaded. The sheet metal siding is just on the ends of the car, and there is no bottom.

The bucket, when dropped slowly into place, has its tilted side resting on rails *B* and *C* and discharges over rail *A* into the kiln. The bucket is laid down on the rails, and a man disconnects the two front chains. As the bucket is now raised only by the back chains, it tilts 90 deg. and spills its load of rock into the kiln.

Similarly rock is stock-piled nearby on the quarry floor. When bad weather makes it difficult to work in the quarry, the Koehring shovel moves over and loads buckets from the stock pile, and the derrick hoists it directly to the kilns. The same derricks are used for handling coal from cars below. The operation makes it possible to work any face easily.

WHAT ABOUT THE RISING ACCIDENT RATE?

Action Needed to Turn the Tide of Cement Mill Mishaps

By A. J. R. Curtis,
Assistant to General Manager, Portland Cement Association

YES, the cement industry has been slipping, seriously, with respect to mill and quarry accidents.

For ten years the industry made uninterrupted progress in the reduction of personal injury mishaps. At the conclusion of that remarkable period, the gross number of accidents had been reduced to 5% what it had been ten years before. That was at the end of 1933.

Then came 1934 with an increase of around 60% in lost-time and more serious accidents, the poorest accident frequency showing in five years, the poorest severity showing in nine years, and the highest fatality rate in ten years. Not a record to be proud of, although not altogether inconsistent, in view of the extraordinary hazards and the general circumstances.

An increasing accident rate, like a needless accident, usually has one useful application—it may be made effective as a warning for the future. Under ordinary circumstances, information can be salvaged from almost any mishap, which, if effectively used, can do more than anything else to lessen the chances of or at least postpone recurrence of the same sort of error. But at present there is less than usual to be salvaged from our accident experience, so many of these unfortunate occurrences being due fundamentally to unusual economic conditions.

Causative Factors and Alibis

Here are some of the more obvious contributing factors:

Short, intermittent periods of operation and employment.

Short daily working schedules with more shifts and irregular working assignments in order to equitably distribute available work.

Low family income among mill employes with attendant difficulties.

Many distractions and demands on their time which have prevented executives from devoting usual attention to plant safety.

Deferred expenditures for mill repairs and replacements.

There are other causes, too, and in some cases safety effort has been let down—a breakdown in our usual uniformly fine supervision. But in some other cases (and there are a great many of them) safety effort was never finer nor were results ever more encouraging. Witness, for example, that three of the largest plants in the entire industry worked throughout 1934 without a lost-time accident. Glance at the following table comparing the frequency of accidents in each 25% group of plants in 1934:

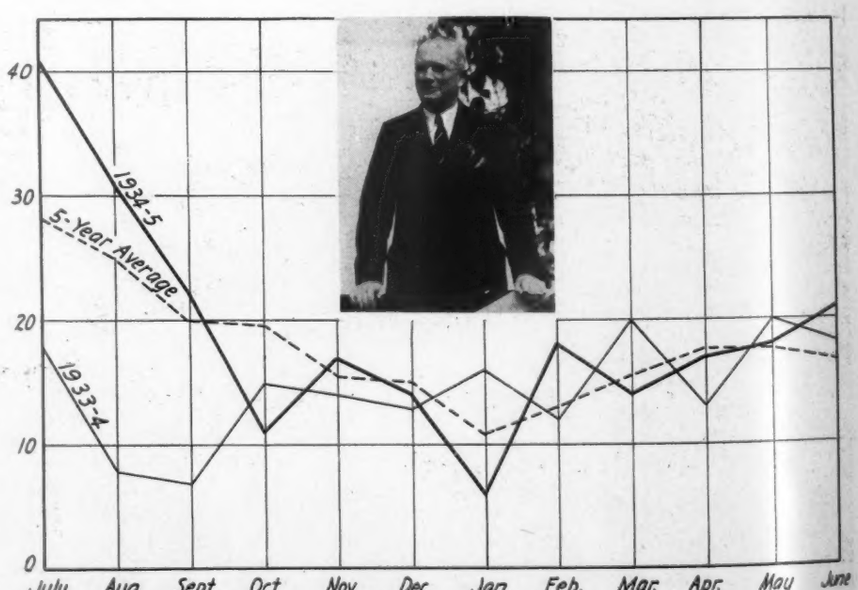
FREQUENCY COMPARISON—1934

	No. of plants	Man hours	No. of acc.	Freq. rate
1st 25%..	32	10,370,058	0	0.00
2nd 25%..	32	6,302,214	14	2.22
3d 25%..	31	8,017,005	62	7.73
4th 25%..	31	7,311,518	160	21.88

If, in the face of common difficulties, *many* plants could produce so fine a showing and *some* could even *improve* on their past safety performance, why shouldn't we toss all of our stated causes out of the window, clear our minds, sharpen our wits and in the next few months *duplicate generally* what these winners did in 1934? Someone has said, "An alibi is a statement of the excuse under which a man fails to do his duty." As an industry, we may have some valid excuses, but aren't we alibiing considerably at the same time?

June Results Disappointing

Results of our recent June No-Accident Campaign were *not* satisfactory. There were more fatalities in June, 1935, than in any month since August, 1932—more reportable accidents occurred than for any June since 1930. While the frequency (ac-



The monthly accident curve for the 1933-4 twelve months' period shows that after the third month accidents rather closely approximated the 5-year average; the monthly accident curve for the 1934-5 twelve months period seems to be climbing above the average—8 of the 12 monthly points are above the latter. During the first of these two periods the cement industry merely held its ground in accident frequency; during the second, it probably lost ground.—(The insert shows the author, A. J. R. Curtis.)

cident per million man hours) was down to 4.81 for June as compared with 7.13 for the year 1934, the severity of the accidents was much greater—7.81 as compared with 4.26 for 1934 and 2.66 for 1933. Certainly there is no good reason why our accidents should be growing more and more severe in their consequences; there are many reasons why they should not. But one reason is sufficient. No worker can afford to sacrifice his income or pay out any of his money on accidents. There is a real philosophy in the slogan, "This is no time to get hurt."

Possibly the accident situation is getting a little better since January 1. If so, it may be because the intelligence of our operating organizations could no longer tolerate a serious backward trend. Here is an interesting comparison of the first seven months of 1934 and the corresponding period of 1935. It is still too early to know definitely whether these figures indicate a *real* reversal of the recent serious backward trend of accidents in the cement industry or whether they represent merely a *passing fluctuation* due to operating peculiarities or other causes:

RECORD FOR SEVEN MONTHS

Jan. to July incl.	Lost-time accidents	Permanent disabilities	Fatalities	Total
1934...	115	20	9	144
1935...	91	14	6	111
% reduction	20.8	30	33.3	23

Prompt Action Will Regain Lost Ground

There is a less encouraging accident situation in the cement industry than we have faced for many years. Our traditional attitude toward a situation of this kind is to rise up and swat it, and this is what we will do, for whether we like it or not we have no choice. Delay in so doing would bring more terrible accidents, more cost, more irretrievable losses, higher insurance rates. Prompt action will quickly regain lost ground and put us again on the "profit" side of the safety ledger. Successful safety work in the cement industry has been built upon complete coöperation of management and men—and the journey back from the wilderness must and will be led by our chief executives. But our executives will have to have the support of every man who is entitled to hold a job. Men cannot be made safe any more than they can be made good or skillful by safety committee rule or company order.

Here are some suggestions for the perusal of operating cement men. They are workable. Why not put into effect all that are not now in use in your company or plant?

Suggestions

1. Most company executives now see the report of every mill accident. The chief executive of every cement company should see every report and not permit it to be filed until he has been assured in writing, by the responsible head of his manufacturing operations, that this particular accident cannot happen again.

2. Company operating heads must act decisively to cure the very obvious source of much of our accident trouble—faulty supervision. Not every mill that has escaped accidents lately can claim credit for superior supervision. A number of the latter mills are "riding for a fall"—and they're marked for some severe accidents and will surely have them sooner or later unless standards of supervision are kept at the highest levels.

Responsibility on Key Men

3. Superintendents and foremen carry a heavy responsibility. But they cannot expect to blacklist accidents unless they are willing and able to

—teach and re-teach, warn and re-warn their men.

—recurrently inspect the premises occupied by men working under their supervision, carefully examining buildings, equipment, tools, materials, and everything about the place in order to discover hazards in advance—rather than to do so in sorrow after a bad accident.

—constantly appraise and re-appraise the workmen in order to detect any physical, mental or other hazard.

—promptly and fully report to proper superiors, all hazards of every nature with description and recommendations. This applies to machinery repairs and guards, building maintenance, conditions of men and every other hazard.

—go on record at every opportunity as a safety man, never failing to speak or help out in any way in safety meetings.

—see that their men are fully familiar with the real story of carelessness that lies behind almost every cement mill and quarry accident.

—shoulder full responsibility for any accident that may occur within their jurisdiction, never dismissing the matter until convinced of the cause and the remedy.

—see that the remedy is applied.

4. No workman in any cement plant can afford to get hurt. In the long run, if not immediately, the big cost of an accident falls right back on the man who gets hurt and on those nearest to him. Thousands of widows scrub floors or spend their lives over a washboard because of a husband's carelessness. Thousands of children are similarly denied home and educational advantages to which they are entitled. Carelessness by the husband and father often turns out to be the cruelest form of robbery of his family—and of course he robs himself.

ACCIDENT EXPERIENCE BY SIZE GROUPS—1934

Group	No. of plants	Pct. of total plants	Man-hours expos.	Pct. of tot. man hrs.	No. of accidents	Pct. of total accidents	Freq. rates	Pct. above or below av. freq.
Group A— (Over 300,000 man-hours)	37	29.3	16,533.040	51	111	48	6.71	— 5.8
Group B— (Between 200,000 and 300,000 man-hours)	37	29.3	9,162,427	28.5	57	25	6.33	—11.2
Group C— (Less than 200,000 man-hours)	52	41.2	6,354,328	19.8	64	28	10.07	41
Total	126		32,049,795		232		7.13	

ACCIDENT FREE PLANTS

	No. of plants	Per cent of group total
Group A	13	35
Group B	15	40.5
Group C	23	44

Is a Careless Man Entitled to a Job?

Many cement executives let it be known that they will not countenance the hiring or the keeping of a careless man. In one of the cement mills a few years ago a superintendent—he has been replaced—continued to employ a dangerous man with a recurrent accident record until one day there was another accident in which the man lost both of his hands.

A certain cement plant, equipped in every particular for the safest possible operation, continued to suffer occasional accidents until the superintendent, at the request of the safety committee, put into effect a rule requiring every man who had an accident thereafter to stand trial before the committee and prove he was not to blame for the accident or face dismissal. There were no more accidents for many months and the plant won the PCA safety trophy during the following year.

Is Your Plant Safe?

If you are not absolutely sure, you are, Mr. Superintendent, the fellow who should be doing something about it. "Thou art the man."

Hazards due to physical causes, requiring repairs, lights, guards, locks, stopping devices, goggles and protective clothing are not difficult to handle, nor are they usually expensive to remove.

Hazards due to careless habits, thoughtlessness, or mental or physical incapacity of men are much more difficult to detect and still more difficult to remedy. Nevertheless, remedy is absolutely essential and must not be delayed. If a man is on a job that is beyond his physical ability or mental capacity to handle safely, he *must* be moved to another.

Are All Dusts Harmful?

A Further Discussion of Silicosis and Lung Disability, Supplementing the Article Which Appeared on Pages 40 to 45 Inclusive, of Rock Products for May, 1935 (Contributed)

INDUSTRIAL DUSTS with which rock products workers are confronted have been divided into three classes:

1. **Soluble**—which go into solution and are carried from the lungs without harmful effect.
2. **Inert**—which remain inactive and become incapsulated in the lung areas.
3. **Active**—which may set up general fibrotic conditions and possibly miliary nodulation. Of this class silicon dioxide is the only dust of general interest to the rock products industry.

Available data place limestone (calcium and magnesium carbonates) and gypsum (calcium sulphate) in the first class. Hematite (iron oxide), bituminous coal and carborundum are among the substances placed in the second class; silicon dioxide and magnesium silicate (asbestos) belong to the third class.

Where dust intensities are light or reasonably heavy these classifications (soluble, inert and active) are believed to determine whether a dust is harmful, but when particles of dust of any kind arrive in the lungs continuously over long periods in quantities too great to be carried off or stored without continuing to clog the avenues required for normal lung functioning, harmful effects undoubtedly can be anticipated.

This position has been taken by the U. S. Bureau of Mines after many years of observation and study by an experienced staff. The Bureau's circular I. C. 6835 quotes the German investigators Lochtkemper and Teleky (1932) as follows: "The breathing of any dust leads to injury of the lungs if it is intensive enough and continued long enough."

A number of interesting excerpts from this circular have been given at the conclusion of this article.

What Are "Light" and "Heavy" Concentrations?

No definite dividing lines have been established between "light" and "heavy" concentrations of dust, nor has the point been fixed above which any dust must be considered harmful regardless of its composition. A few hundred million particles per cubic foot of soluble dust probably can be inhaled continually without any particular harm; concentrations up in the BILLIONS OF PARTICLES per cubic foot of breathing air would seem likely to be harmful regardless of composition.

If such concentrations exist in the rock products industry—

(1) an actual lung hazard might be present no matter how harmless the composition of our dusts might be;

(2) even limited proportions of silicon dioxide dusts might be sufficient to set up a "hypothetical" silicosis hazard.

Hypothetical Hazards

Here is an example of how a "hypothetical" silicosis hazard might be made to appear as a *real* hazard:

It is generally conceded that 5 million particles per cubic foot of 100% silicon dioxide under 10 microns in size can be inhaled continuously without harm to the lungs. No one is certain that higher concentrations of pure SiO_2 can be breathed continuously without possibility of damage. The causative factors for silicosis are dust composition, particle size, concentration and period of exposure. Many "experts" (including expert witnesses) *assume* that these factors are interchangeable.

Thus, they start with:

5,000,000 (allowable particles per cubic foot) × 100% (SiO_2 composition) × 100% (proportion of particles ½ to 10 microns)

and (for example) find it equivalent to:

500,000,000 (particles per cubic foot) × 1% (SiO_2 composition) × 100% (size ½ to 10 microns)

balancing, of course, from a mathematical point of view.

(*a*) Suppose men are exposed constantly to a concentration of 750,000,000 particles of dust, 1% of which consists of SiO_2 particles ½ to 10 microns in size. On the basis of the above, the *known safe limits assumably have been exceeded by* 50%.

(*b*) Suppose men are exposed constantly to a concentration of 750,000,000 particles of dust containing 10 per cent silicon dioxide ½ to 10 microns in size: the known safe limits assumably have been exceeeded by 1400%.

These assumptions are not justified. There is little if any scientific information with which to affirm them. But the fact remains that medical men and lawyers are figuring potential hazards on this basis every day and they are referring to them as *real* hazards and making it stick.

Mixed Dusts

Most of the available scientific information on the effects of inhaling silicon dioxide dust (SiO_2) comes from cases where the proportions of SiO_2 were very heavy; that is, above 50% and in some cases above 90%. Studies on experimental animals employ dust that runs nearly 100% silicon dioxide. The results give an idea of the possible effects of inhaling dusts that are preponderantly silicon dioxide, but it is merely a matter of *assumption* that these hold for lower percentages of SiO_2. The possible effect of other dusts, present with the SiO_2, generally have been disregarded.

Dusts with which the rock products industries have to contend so frequently contain only minor proportions of silicon dioxide that the question as to what effect other dust ingredients present may have is a very vital one to this industry. Several investigators have studied the effects of such dusts as calcium, clay, cement, gypsum, carborundum, marble and asbestos mixed with silicon dioxide, and have predicted findings to the effect that several of these mixtures lessen the potency of the latter.* Few conclusive reports are yet available.

Three theories have been advanced as to how this action may possibly take place: (1) Through chemical reaction with lung secretions; (2) through agglutination of particles in the respiratory passages; (3) through agglomeration of positively and negatively charged particles in the air.

Referring to Previous Article

In a previous article on the subject of silicosis which appeared in Rock Products for May (pages 40 to 45 inclusive), it was stated in effect that:

(1) the only harmful non-toxic dust to which rock products workers are exposed is silicon dioxide (free silica) usually found in silica sand and elsewhere as quartz and occasionally as chert or flint;

(2) the inhalation of silicon dioxide in sufficient quantities is known to produce silicosis, which (if it is disabling) is the only disabling pneumoconiosis† except asbestosis;

(3) dust, per se, even in heavy concentrations, does not cause silicosis. Silicon dioxide must be present in sufficient quantities.

However, in the light of the recent information discussed above, it is logical to substitute the following:

(1) All dusts seem to have harmful effects if breathed long enough and in sufficiently heavy concentrations within the dangerous size range (½ to 10 microns). In reasonable concentrations, such as prevail generally in the rock products industry today, the only harmful non-toxic dust to which cement workers are exposed, to even a very limited degree, is silicon dioxide.

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*Experimental animals have shown no silicotic reaction on exposure to mixtures of SiO_2 and certain non-siliceous dusts. However, alternate exposure to unadulterated SiO_2 and the non-siliceous dust produces a definite silicotic reaction. The modifying effect of certain dusts is quite generally suspected. It is not yet known *why* the effect of silica seems to be modified when breathed in these mixtures.

†The name means "dust lung." The word is now used to designate a disease or condition of the lungs due to the inhalation of minute particles.

(2) The continued inhalation of dense dust over long periods may produce a pneumoconiosis, the action being that of mechanically glutting the passages and particularly the lymphatic or "sewer" system of the lungs. The resulting effect may occur within the presence of silicon dioxide; therefore, it should not be classed as silicosis.

(3) Thus, while dust, per se, does not cause silicosis, it may, if breathed in very heavy concentrations over long periods, cause lung disability.

More About X-ray

It is generally agreed that X-ray pictures of the lungs are not dependable as a means of diagnosing pathology unless expertly taken and interpreted with the aid of occupational and medical history and a complete physical examination. Although this fact is commonly stated, it is surprising how frequently it is disregarded. For one thing, physicians are still reading X-ray film and diagnosing silicosis without the benefit of occupational history. This should never be done.

Here is an example: A reputable and painstaking physician, who specialies on the lungs and recently has examined many men for possible dust conditions, had an X-ray picture made of a young man in his twenties who was employed as a fireman in a non-dusty department of a rock grinding operation. The doctor interpreted the picture as showing early silicosis, although apparently he had not seen or considered the man's industrial history. The latter shows that the man had worked one year where now located, two years previously as a truck driver, five years previous to that as a tester of tractors, and two years prior to that time as a section hand.

Silicosis? How could this man possibly have developed the disease without more than the incidental exposure to silicon dioxide dust revealed by his industrial history?

Division of Responsibility

The division of competence and responsibility between the roentgenologist (X-ray technician) and the medical expert is not always understood. The *roentgenologist* should be qualified to take pictures and to interpret them very definitely as to the physical conditions shown. With his X-ray picture (roentgenogram) before him, he should explain its defects if any, and should be able to give an exact word picture of the conditions prevailing in the region X-rayed, so that the physician may be able to judge the significance of these conditions as possible disease symptoms. The roentgenologist's job is to take pictures and explain the physical conditions shown; the physician says whether or not these indicate a disease and if so, what stage.

Not infrequently in the past have come reports of X-ray technicians to the effect that a plate indicated silicosis (which he is not competent to judge) on the basis of certain shadows appearing on his picture. No such report is competent. The physician with his case history and physical examination to rely on may know that although the roentgenogram shows shadows frequently present as indications of silicosis, the latter disease cannot be present unless the case history shows exposure to silicon dioxide.

Beware of Deception

The most commonly reported trickery in connection with X-ray pictures is the substitution of one picture for another. This deception has been practiced on the medical examiner or the latter may be party to deception of someone else, such as the court, a witness or an employer.

Thus, a diseased applicant may present a clear picture (of the chest of another) with his employment examination, a medical witness may be influenced by having shown to him some "switched" pictures not taken on the chest of the person on whose condition he is testifying or similarly "switched" pictures may be presented as evidence in court.

In view of the foregoing, it is advisable that no X-ray evidence be permitted except where taken by an operator and interpreted by a specialist designated by the court. Medical witnesses should not be expected to study or interpret pictures except in connection with case histories and physical examination reports known to be trustworthy. Every precaution should be exercised at all times to guard against substituted as well as improperly taken pictures.

Pertinent Paragraphs Quoted from U. S. Bureau of Mines Circular I. C. 6835

The majority of experts admit that the so-called "inert" dusts are not really inert when considered from the pathogenic point of view. Although at the outset they are not harmful and even when present in the workroom in large quantities some of them cause only transitory discomfort (sneezing, watering of the eyes, cough), it is certain that as the organic reactions diminish and the sytem seems to have recovered from the effects, they nevertheless finally attack it in a subtle manner, sometimes even seriously. The mucous membrane of the nose, the conjunctiva, and first the upper and subsequently the lower respiratory passages, the teeth, the skin, and often the digestive tract are subjected to the harmful action of these dusts.—pages 2 and 3.

* * *

Any man suffers from fibrosis to the extent to which he is exposed to the continued inhalation of mineral dust. If there is no dust, there will be no fibrosis, and conversely, the continued inhalation of dust certainly produced fibrosis.—Principle laid down by royal commission investigating pulmonary diseases of gold miners in Western Australia—page 21.

* * *

In the report of a study of dust conditions in German industries, published in 1932, Lochtkemper and Teleky stated in the summary:

The breathing of any dust leads to injury of the lungs, if it is intensive enough and continued long enough.

With intensive and long-continued inhalation of dust, entirely quartz-free dust leads to lung changes clearly recognizable in the X-ray picture. The blood vessels appear more clearly defined; there are also more numerous and thicker honeycomb formations, also infiltrated mottling which, however, never shows the very sharp delineation and density caused by quartz. The subjective symptoms referable to the changes are slight; there is none of the lung rigidity characteristic of silicosis but a complication of diseases, especially bronchiectasis and emphysema.—page 36.

* * *

In discussing the nomenclature of dust diseases, Drs. Pancoast and Pendergrass* state that although silica (SiO_2) seems to be the active fibrosing agent in most conditions recognized as essentially a pulmonary fibrosis adherence to the general term "pneumoconiosis" still seems advisable. Some other dusts undoubtedly cause a fibrosis directly, and still others may either tend to retard the action of silica, as coal dust and clay, or enhance its action, as alkalies in the mixtures of silica and powdered soap in scouring powders. Silicosis is the word much more frequently used, mainly because it is not so unwieldy and usually describes accurately the particular phase of the condition under discussion.—page 39.

* * *

According to Haldane** evidence is accumulating constantly that scattered fibrosis, giving essentially the same X-ray picture as early silicosis, is comparatively common as a result of excessive dust inhalation, but without acompanying liability to tuberculous infection. However, he thinks that this condition should not be called silicosis, and since it seems to arise from excess of any kind of dust and not merely silicate dust pneumoconiosis seems the most suitable name for it.—page 39.

* * *

It is generally accepted that the X-ray offers the best and most reliable indication of the lung changes that occur in silicosis, particularly in the early stage. The value of this method of diagnosis depends largely upon the skill of the technician who takes the pictures and the experience of the reader who interprets them.—page 53.

* * *

Nasal obstruction and chronic catarrh, enlarged turbinates, adenoids, or other conditions that cause mouth breathing are associated with an increase in the incidence of silicosis. Persons having a vertical hanging heart are more likely to develop tuberculosis or already have it; this finding agrees with South African experience.—page 52.

Specifications for Foundry Sand for Navy

THE National Bureau of Standards has recently formulated purchase specification for 12 grades of foundry sands which are used in molding practice in the foundry of the United States Navy Yard, Naval Gun Factory, Washington, D. C.

These specifications are based largely upon the physical properties as determined by laboratory studies on the grades of molding materials in use in the foundry of the Naval Gun Factory. The sand and clay contents of each grade are controlled by grain fineness number, grain fineness class, clay content per cent and class, grain distribution, and grain shape. The limits for variation in physical properties also include moisture content, permeability, compressive and tensile strengths, surface hardness, and sintering point. Each specification indicates methods for sampling the sands and describes briefly testing.

*University of Pennsylvania.
**A leading British investigator.

Above—Left: Dredge for Green Bros.' portable plant, cutting into bank. Right: Portable plant: pipe from dredge deposits on flat screen, at left; conveyor belt leads to truck hopper, at center; conveyor at right goes to stock-pile

Portable Gravel Plant—Dredge Operated—Erected and in Operation in Five Days

GREEN BROS., Franklinton, La., erected a portable sand and gravel plant to furnish aggregate for 30 miles of bituminous road surfacing late in April, this year. The plant was set up on the bank of the Bogue Chitto River near the job. Entire construction was completed and operation begun in 5 days.

A small wooden dredge boat was built, equipped with an 8-in. Amsco pump, driven by a 100-hp. Worthington Diesel engine. The intention was to dredge out of the river bottom, but a layer of hard clay was encountered, and the operation was shifted to work the banks.

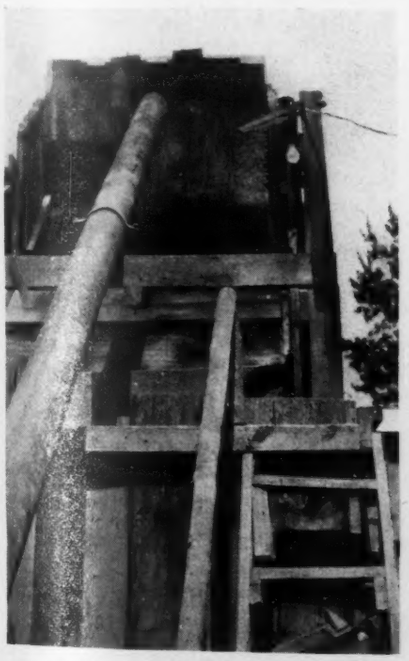
A 6-in. Gould pump, driven by a Continental gasoline engine, is used to wash down the banks so that the material can be easily reached by the dredge pump. The 6-in. pump was set up on top of the bank and its discharge was used to cut the banks down from the top.

The discharge from the dredge pump goes direct to a gravity screen on a 45 deg. dip. As one of the views shows, the direction of the discharge is reversed by pumping against the back of the screen housing. This is protected by a piece of old screen placed upright. The screen cloth on the gravity screen is ⅜-in. mesh; all material passing this screen falls into a hopper below. Oversize passes to an 18-in. Robins belt conveyor elevated at an angle of 20 deg., with 75 ft.

View of dredge, showing Diesel motor-driven pump in center

Above—left: Gate device in "open position," so that gravel discharges into hopper below. Right: Gate device in position to pass gravel from first belt to second, and then to stock-pile

centers. This belt is driven by a 15-hp. Le Roi gasoline engine, mounted at the top, by means of a chain drive. Another similar belt conveyor is placed end to end with the first one, extending further upward and at the same angle, the break being for loading trucks directly from the lower conveyor by means of a small wooden hopper. The upper conveyor extends to the limits of the stock-piling area and the upper pulley can be lowered or raised up the incline, according to where the gravel is to be stock-piled. The same Le Roi engine laso drives this belt.



An old piece of screen wire is used to take impact of discharge from 8-in. pump

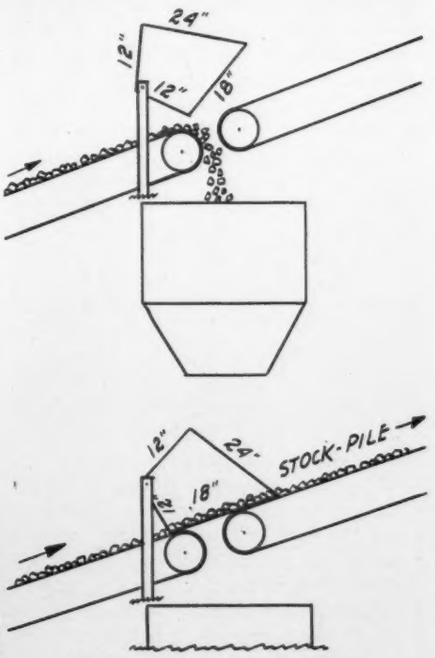


Diagram of gate arrangement

The gap between the two conveyors is bridged by a sheet metal framework. In the raised position (mounted on a steel rod to 2 by 4's) gravel will fall to the truck-loading hopper below, and in the lowered position the gap is bridged permitting passage to the other conveyor and to stock-pile. The plant can produce up to 650 cu. yd. per 8-hr. day, but regularly produces from 300 to 400 cu. yd. per day.

Sand and Gravel

Morrow County Sand and Gravel Co., Cardington, Ohio, began operation of a new plant early in August. Herman Irey is president. He also owns the Irey Stone Co., whose plant is 8 miles west of Cardington. The gravel deposit is reported to be 50 ft. thick with 6 ft. of overburden. About 200 to 250 tons of washed sand and gravel will be produced daily. The plant cost about $20,000.

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Union Pacific Ry. ceased production at its Buford, Wyo., gravel ballast pits early in August—the season's requirements having been produced.

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Meramec Portland Cement and Material Co., St. Louis, Mo., has filed suit alleging breach of contract and asking for $600,000 damages against the Missouri Portland Cement Co., Mississippi River Sand & Material Co. and Theodore Rassieur, attorney. The petition charged failure to abide by the terms of a verbal agreement made in 1928 providing for merger of various building material firms. Attorney Rassieur, according to the petition, was the legal adviser. Judgment for $500,000 actual damages and $100,000 punitive damages is sought. Similar suits by six other material firms involved in the same merger, which was not completed, were filed last year. The defense filed demurrers in these suits, asserting no cause of action was stated.

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San Antonio, Tex., has purchased 10 acres of gravel property to produce its own street requirements.

Building Materials Used in American Homes[1]

By Oliver Bowles[2]

VALUABLE DATA on the types of materials of which American homes are constructed may be found in the "Real Property Inventory" made recently by the Bureau of Foreign and Domestic Commerce. As the survey covered 64 cities scattered throughout the entire country (at least one city being chosen from each state) and included 1,931,055 residential buildings occupied by 9,074,783 individuals, it was extensive enough to furnish a fair cross-section of conditions throughout the country. The dwellings were classified according to the principal material of construction, although the fact is recognized that a dwelling made principally of brick employs also considerable wood and, possibly, stone trim and that, conversely, one made chiefly of wood may employ a good deal of brick or cement. The buildings canvassed are classed on the basis on five materials of construction; namely, wood, brick, stone, concrete, and stucco. It did not seem feasible to designate stucco buildings by the material in the backing, because in many instances the nature of this material could not be ascertained readily. Therefore the term is not as indicative of the principal material of construction as are the other terms employed.

A summary of the data accumulated for the 64 cities follows:

DWELLING UNITS OF 64 CITIES CLASSED ACCORDING TO PRINCIPAL MATERIAL OF CONSTRUCTION

Material.	Number of structures	Per cent of total
Wood	1,584,058	82.04
Brick	206,512	10.69
Stone	4,545	.24
Concrete	7,574	.39
Stucco	115,898	6.00
Other	11,075	.57
Not reported	1,393	.07
Total	1,931,055	100.00

The preponderance of wood is noteworthy. It is difficult to overestimate the value of wood as a construction material since America was discovered, and it will continue to occupy an important place in house building for an indefinite period. However, judging from the history of construction in other countries, a gradual trend from wood to materials of mineral origin is to be expected, particularly for the parts of structures that are exposed to the weather. The influences behind such a movement in America are (1) a less-ready availability of wood in many localities, (2) a demand for fireproof construction, (3) a tendency toward permanence and stability in building that characterizes a more mature national economy, and (4) a desire for low maintenance expense.

In materials used for home construction America contrasts strikingly with England. During a recent visit the writer gave special attention to the types of homes throughout central and southern England and North Wales. Structures in which wood is the principal material of construction in these localities are virtually unknown. Buildings are made of stone, brick, concrete, stucco, or artificial stone. Brick is used extensively in homes built recently or under construction. A popular type of dwelling has walls of solid brick and interior partitions of brick. Stone is used widely and was employed even more extensively in past years; in many localities a large proportion of all homes are of stone. This condition prevails particularly in territories adjacent to quarrying centers. In the city of Bath in Wiltshire, for example, where an oolitic limestone has been mined underground for centuries, approximately 95% of all the buildings are of Bath stone. Here the wall construction of many dwellings consists of an exterior stone wall, a 2-in. air space, and an interior brick wall, making a total thickness of 11 in. As indicated in the table, stone is used as the principal material of construction in only 0.24% of American homes.

For reasons already enumerated, a gradual increase in the proportion of brick, stone, and concrete structures is to be expected in America. The data presented in the table indicate that producers of these materials have an enormous potential market awaiting development. The movement toward wider use of rock products, stimulated by the influences enumerated, may be retarded by inertia and conservatism or by a wider use of metals. On the other hand, it may be accelerated by improvements in products, reductions in costs, and promotional enterprise on the part of producers of building materials of mineral origin.

Why are rock products limited in modern home construction in America largely to minor elements and accessories? The high cost of transportation of heavy products doubtless is a serious handicap that may be overcome to some extent by cultivating more extensive local markets. Difficult workability renders stone a costly material to shape into building units, and although methods and equipment during recent years have been greatly improved much progress is still possible. Brick and concrete block manufacture have also progressed both in technique of fabrication and in quality of products, but the cost of transporting and placing the blocks in walls is relatively high.

The substantiality, dignity, permanence, fire resistance, and low maintenance cost of stone, concrete, and brick structures have not yet been fully capitalized. When they attain wider popularity combined with reasonably low cost much more extensive markets are to be anticipated. Certainly an extended inquiry should be undertaken in an effort to understand the situation more clearly and to overcome some of the handicaps. The survey recently made by the Bureau of Foreign and Domestic Commerce is a long step in the right direction.

[1]Published by permission of the Director of the Bureau of Mines. (Not subject to copyright.)

[2]Supervising engineer, building materials section, United States Bureau of Mines.

Bureau of Mines Nonmetallic Minerals Experiment Station

THE United States Bureau of Mines Nonmetallic Minerals Experiment Station at New Brunswick, N. J., has been placed in charge of Oliver C. Ralston, of Clarkdale, Ariz., as supervising chemical engineer. He succeeds Dr. Everett P. Partridge, who resigned to enter private employment. Mr. Ralston entered the service of the Bureau of Mines in 1912. When the United States entered the World War, he resigned to engage in technical supervision of the manufacture of munitions at Niagara Falls, N. Y. After the war, Mr. Ralston returned to the Bureau of Mines, where he remained for eight years, acting for some time as supervising engineer of the Pacific Experiment Station, Berkeley, Calif.

Gypsum

Victoria Gypsum Co., Little Narrows, Cape Breton, Nova Scotia, is erecting a crushing plant and shipping pier, and is building a road and developing a quarry. Capacity will be 200 to 400 tons per day. Storage for 20,000 tons during the winter is being provided. Stephens-Adamson Manufacturing Co. is doing the engineering.

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National Gypsum Co., Buffalo, N. Y., merger with **Universal Gypsum and Lime Co.,** Chicago, Ill., is said to virtually assured. It was reported on August 20 that more than 51% of the preferred and common stock of Universal had been deposited. The exchange of stock will involve approximately 68,000 shares of National common and 8800 shares of preferred stock. The plan provides that holders of the $60 par cumulative preferred stock of Universal will receive one-half share of National 7%, $100 par, preferred stock for each share held. One and one-half shares of National common will be issued to Universal shareholders for each ten shares of Universal now held. It was said that as a result of the merger plans, bonds of Universal which about two months ago were selling at $20 are now selling at $100.

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Cardiff Gypsum Plaster Co., Fort Dodge, Iowa, reopened its plant recently after a shutdown of several years. The company has been reorganized by local capital and Martin Swalin, Fort Dodge, is general manager.

Lime

Dixie Lime Products Co., Ocala, Fla., is now operating what is said to be the only dolomite plant in Florida. The plant was built about six months ago at Lebanon, where there are railroad facilities, but the quarry is five miles southeast of the plant. An Erie ¾-yd. gasoline-driven dragline is used both for stripping and loading the stone. The overburden varies from 12 to 24 in., and the deposit, judging from the prospecting, extends to considerable depth. The rock is loaded into 2½-yd. hydraudic-dump trucks and hauled to the plant. The trucks back up a short 15-deg. angle incline and dump directly into a small hopper which feeds to the crusher as fast as the rock falls in. The crusher, directly below the hopper, is a 42x24-in. corrugated-roll Maddox crusher manufactured at Archer, Fla. The rock is crushed to 1½ in. and discharges into a Jeffrey bucket elevator, consisting of 8-in. buckets closely spaced on a chain, and is elevated to a 4x30-ft. cylindrical dryer. The dryer is fired by wood. After being dried, the rock is discharged into a Jeffrey hammer-mill, which pulverizes it to the final size—it is not known just to what size, but some of the product is fine enough to pass a 200-mesh screen. The final product is sacked, and automatic scales, manufactured by the Exact Weight Scale Co., are used to fill the sacks to 200 lb. A 125-hp. wood-burning boiler supplies the steam to drive a 100-hp. steam engine, manufactured by the Chandler Taylor Co. All machinery is belt-driven by this steam engine. The plant is capable of producing 90 tons of the product (agricultural limestone and fertilizer filler) in an 8-hour day. The rock is one containing 55% calcium carbonate, 35% magnesium carbonate, and about 10% silica, alumina and iron.

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Alabama: For 41 days ending August 10 every lime plant in Shelby county was closed by a strike. About 1500 employes were involved.

Dixie Lime Products Co.

New steam power plant

River Sand and Gravel Co. adds improvements

Ste. Genevieve, Mo., is celebrating its bicentennial (the last week in August). Chicago newspapers and those of other big cities are devoting considerable space to its past glory and its former place in the fur trade. No mention is made of the fact that it is today the center of the chemical lime industry—about as pure a high calcium lime as made anywhere in the world. It looks as if the lime manufacturers of Ste. Genevieve missed an opportunity for publicity that comes only once in 100 years.

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Kelley Island Lime and Transport Co, Cleveland, Ohio: Quarry men on Kelley's Island have discovered a groove cut by glaciers approximately 100 ft. wide and varying from 6 to 10 ft. in depth. It is the largest ever discovered here. The new groove is unique in that it extends from the northwest to the southeast, at right angles to all other grooves on the island. The new find is filled with boulder clay, which indicates that the northwest glacier pass preceded the northeast ice movement which produced the celebrated grooves in the state park. Unfortunately the newly discovered groove is inaccessible to the general public, and much of it eventually will be quarried away. Because of the great scientific interest in all evidence of glaciation here, a portion of the groove will be left undisturbed and may be thrown open to public inspection at some time in the future. Kelley's Island in Lake Erie, off Sandusky, Ohio, has long been of interest to geologists because its limestone ledges furnish much evidence of the movement of glaciers.

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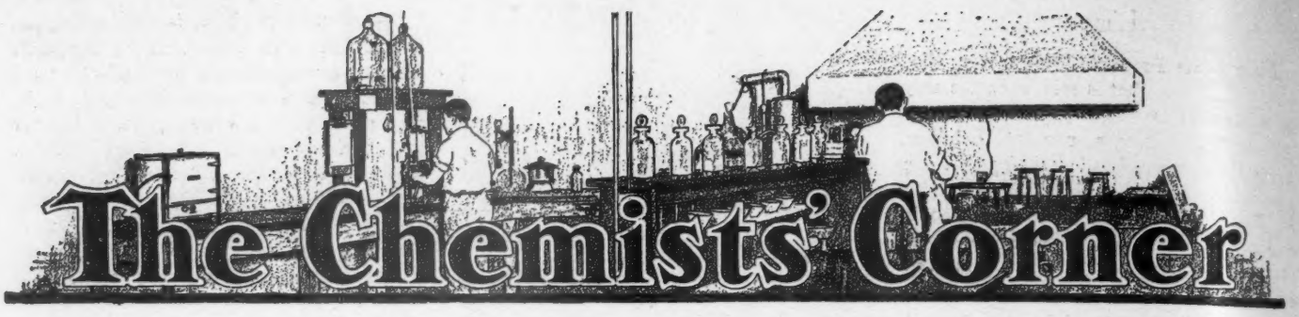
Sand and Gravel

River Sand and Gravel Co., Owensboro, Ky.: Plant is undergoing progressive improvements. A Wiley-Whirley 1½-yd. clam, electrically driven crane has been added, and unloading from the barges has been considerably speeded up. The crane is mounted on railway rails, spaced 15 ft. apart, running from the bank out to a 20- by 20-ft. reinforced concrete pier approximately 60 ft. high, one-half of it being under water at normal water level. The crane has an 85 ft. boom. An all-steel loading hopper has been added to receive aggregate from the crane and place it on the belt. The bin is 12 by 12 ft. by 5 ft. deep. It discharges to a 20-in. new Robins belt conveyor, 110 ft. centers. This belt discharges into the plant. The intention is to rebuild the rest of the plant so that soon it will be entirely of all steel construction. Some vibrator screens will be added. Although separation is made at the dredge, further and more accurate separation will take place at the plant. The cylindrical screen on the dredge has recently been replaced with a 4 by 12 ft. Robins Gyrex vibrating screen. Also a 20-hp. (300 r.p.m.) Witte horizontal steam engine has been added to drive the welder and the bilge pump.



Relationship of Mill Charge to Surface Area of Cement

By W. R. Chandler,
Chief Chemist, Idaho Portland Cement Co., Inkom, Idaho

THE DESIRE to ascertain the effect of varying mill charges upon the quality of portland cement as expressed in the surface area exposed has prompted the work outlined in this paper. The idea itself is not new. But a new interpretation can be given it when it is remembered that the usual method of arriving at increased fineness has been to stretch the *time* of grinding using the already existing charge of media. In addition, it brings into play later conceptions of fineness as expressed by surface area. The design and construction of apparatus for surface area determination was a secondary but necessary consideration. Believing that a more detailed description of the operation of this apparatus than is usually found will prove of interest it will be presented.

A laboratory ball mill, 18 in. x 24 in., running at 43 r.p.m., was used in these tests. This was constantly loaded with 550 lb. of media, which filled it to a point 1½ in. below its center line. A revolution counter was fitted to the mill, and for each charge of cement ground, the mill was given the same number of revolutions, viz., 850. For discharging the mill a slotted door is provided in its side, which holds back the grinding media and permits the cement to pass. One thousand revolutions of the mill has been determined as being the number necessary to empty the mill of cement.

A search of the available literature indicates that there is some disagreement of opinion as to the advisability of using a laboratory mill for estimating probable grinding results to be obtained in a full size mill.

Comparing laboratory mill and commercial grinding, Roller[1] states: "* * * and shows that the particle size distribution is practically the same (in a laboratory mill) as when ground commercially." On the other hand, Hutton[2], in speaking of laboratory mills, says, "* * * as a measuring device, * * * it is not to be considered. Both experience with commercial and laboratory cylindrical mills, and a study of the theory of their operation prove them to be unfitted for such service."

A special grindability machine has been developed by Hardgrove[3] of which Frisch and Holder[4] make the statement, "The writers, after testing a large number of samples (coal) both in an Abbe jar mill * * * and in the special grindability machine proposed by Hardgrove, have concluded that if proper care is exercized in preparing the sample and making the test there is little to choose between the two devices * * *."

These facts were considered before choosing a laboratory ball mill to work with, and the results obtained are to be accepted only as comparative with each other. No definite predictions can be made as to comparative results which might be expected from a commercial mill. It is, however, perfectly reasonable and safe to assume that *trends* would result by following the guidance pointed out by laboratory deductions.

Particle Size Distribution

Investigators have not yet fully agreed upon the size distribution most desirable in portland cement. The statement is frequently seen that any particle smaller than 10 microns will hydrate almost immediately, even while being gauged, thereby destroying the effectiveness of a large percentage of the potential strength of the concrete. Other investigators prefer to believe that some sort of fineness modulus or definite grading of micron sizes will produce the best results. This is sometimes partially expressed in a "coefficient of effective fineness." Later theories prefer a classification calling for fineness defined by the surface area exposed by the particles of cement; having as a goal the maximum area exposed, confined within an economic cost of producing such large areas. This necessarily must be modified somewhat, when low-heat or special cements are under consideration. Certainly the conception of fineness as expressed in standard specifications calling for an arbitrary per cent on or through a 200-mesh sieve, does not give a true idea of the effectiveness of grinding.

From a large mass of literature upon the subject a few pertinent remarks may be quoted. Reed-Lewis[5] states that particles under 10 microns in nominal diameter are essential to plasticity and early strength. He further states that up to ages of 28 days particles up to 30 microns contribute substantially to strength, and that particles coarser than 75 microns have no significant value as a cementing medium in concrete. According to him, when working with normal clinkers, the depth of hydration in microns is approximately equal to the cube root of the age in days.

In a progress report of the Portland Cement Association in June, 1932, the following paragraph appears: "The most outstanding feature of the tests is the fact that the finest fraction, containing nothing coarser than 6 microns, shows the highest strength at all ages if allowance is made for the higher water-cement ratio necessarily used in testing it. Fractions coarser than about 50 microns have very low strengths, even at 28 days." It appears to be fairly well established from this same report that the finer the fraction the more concentrated is the C_3S in the fraction. Further evidence along this line is furnished by Roller[1], "* * * there is a definite segregation during grinding of the constituents of portland cement into particle size categories." Carlson and Bates[6] state that "C_3S is more concentrated in finer than coarse particles," and further draw the conclusion that the activity of finer sizes is due to their greater surface and higher percentage of C_3S.

Rordam[7] says that "* * * in his opinion it is the cement finer than 10 microns which is the really important material." Regarding concrete he says, "If strength alone were considered, one might say that the material finer than 25 microns represented the flour in the cement. But it is the material finer than 10 microns which alone contains the

two essential qualities of strength and plasticity."

Consensus of opinion is conclusively in favor of finer grinding, not necessarily that the per cent remaining on a 200-mesh sieve shall be lowered, but that the per cent of 10-micron material shall be raised. When it is considered that the ratio of area factors of minus 10-micron material to plus 10- minus 20-micron is three to one, one can readily appreciate the large difference made in surface area by any increase in minus 10-micron material.

Apparatus Used for Surface Area Determinations

The apparatus used in these investigations for the determination of surface area is not new in principle or design, but has been assembled and manipulated according to the ideas of this laboratory. Furthermore, it is freely admitted that it may not be as exact or as precise in its results when compared with the most modern microneters or turbidimeters. The use of apparatus of this sort for routine plant control would not be advisable. It is both tedious and time-consuming and was used in this case as being the only means available. However, a sincere effort was made to eliminate whatever factors of error were evident insofar as the facilities of this laboratory were able. The principal effort was directed toward standardization of procedure in order that maximum reproducibility of results would follow. The theoretical principles of operation were closely adhered to, and it is thoroughly believed that the results presented herewith may be considered as accurate when compared within themselves.

The apparatus is of the sedimentation type, following the principle of Stokes' law for falling bodies in its operation. The ordinary grade of kerosene procurable was used as the liquid medium, enough of which was supplied so that no new additions were necessary during this series of experiments. It is quite probable that the selection of sizes, as shown in the table, will not meet with the approval of everyone. It was made on a purely arbitrary basis on the assumption that a greater number of fractions would have a

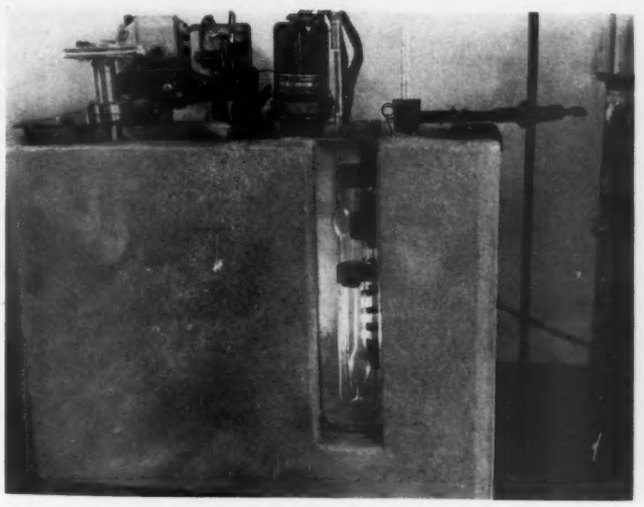


Fig. 3. Set-up of constant temperature bath for viscosity determinations

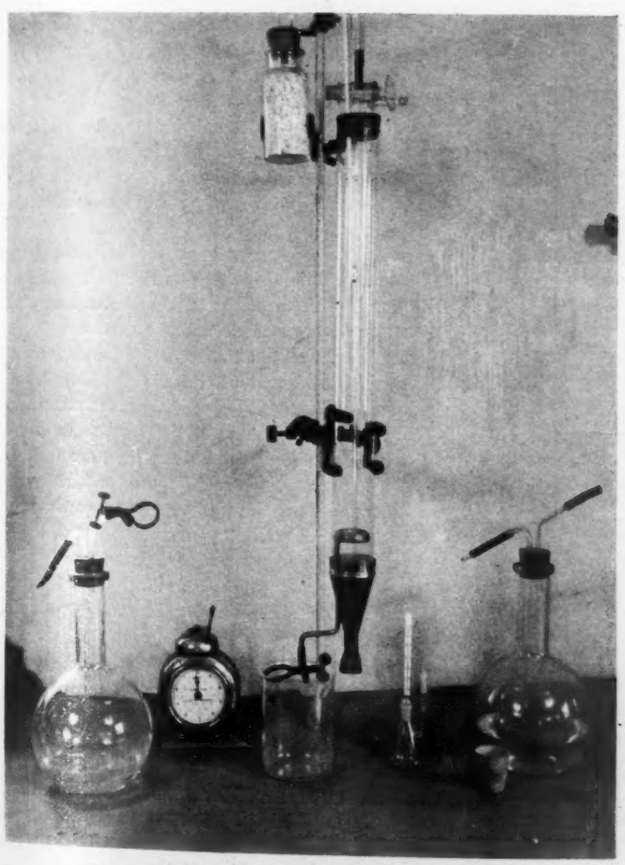


Fig. 2. Assembly of apparatus for surface area determinations

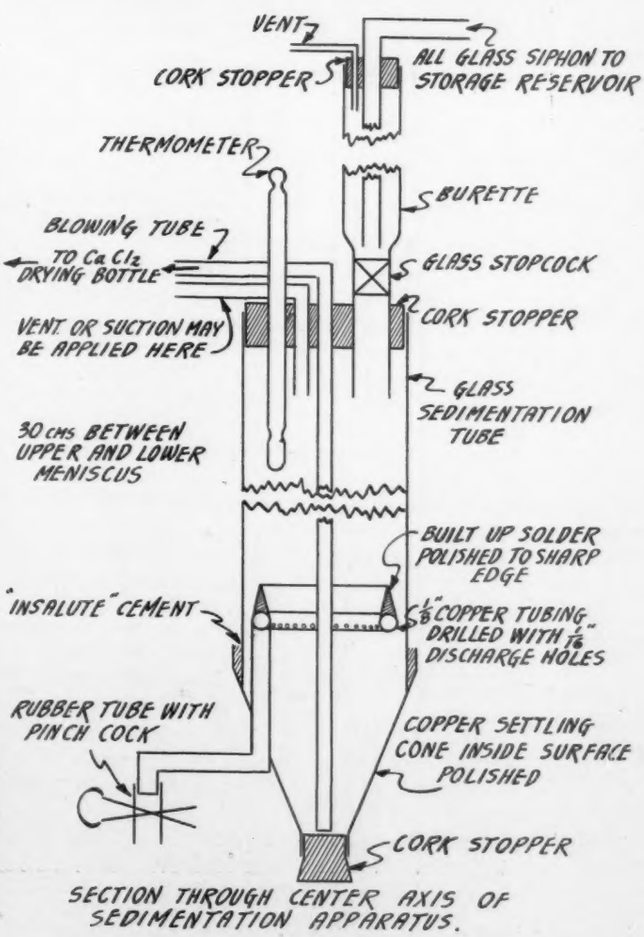

VENT
CORK STOPPER
ALL GLASS SIPHON TO STORAGE RESERVOIR
THERMOMETER
BURETTE
BLOWING TUBE TO Ca Cl2 DRYING BOTTLE
GLASS STOPCOCK
VENT OR SUCTION MAY BE APPLIED HERE
CORK STOPPER
GLASS SEDIMENTATION TUBE
30 CMS BETWEEN UPPER AND LOWER MENISCUS
BUILT UP SOLDER POLISHED TO SHARP EDGE
"INSALUTE" CEMENT
1/8" COPPER TUBING DRILLED WITH 1/16 DISCHARGE HOLES
RUBBER TUBE WITH PINCH COCK
COPPER SETTLING CONE INSIDE SURFACE POLISHED
CORK STOPPER
SECTION THROUGH CENTER AXIS OF SEDIMENTATION APPARATUS.

Fig. 1. Sectional view of sedimentation tube and connections

tendency toward greater accuracy of surface area results.

An examination of Stokes' formula shows that the viscosity of the liquid through which the particles fall is an important factor. Inasmuch as no reliable viscosity values for kerosene could be found, nor would they have been necessarily true for this particular lot of kerosene, it was considered advisable to make the determinations in this laboratory. This was accomplished by means of an Ostwald viscometer pipette. For the use of this instrument it was necessary to design and construct a constant temperature bath. This proved to be a most interesting task, and when completed with adjustable thermo-regulator, relay, stirring device, heating and cooling elements, it was easily possible to maintain the temperature of the bath at any practical figure within limits of 0.15 deg. C. With the exception of a sewing machine motor and its rheostat, the entire bath and accessories were home-made. The bath itself was made of concrete, mixed and cast in the laboratory, using a briquette mold plate cover glass set in one side for the window. The relay was revamped from a single-coil, door-bell buzzer and equipped with Model T Ford coil points for the 110-volt light heating circuit. The thermo-regulator was made of spare glass parts and mercury filled. More than 200 grams of mercury were used in filling it, which largely accounts for its sensitivity. The 3-volt dry cell relay circuit was made through a platinum-tipped adjustable length iron wire. For controlling temperatures a pycnometer thermometer was used, and by using a reading glass, it was readable to 0.1 deg. C. When it was desired to raise the temperature of the bath rapidly, an available 1000W hairpin immersion heater was used. The regular heater consisted of two submerged 60W light bulbs, and cooling was effected with cold water circulated through a coil of copper tubing submerged in the bath.

At least three viscosity readings were made at intervals of 2 deg., starting at 17 deg. C., and running to 31 deg. C. The graph so obtained proved to be a straight line, and it was considered reasonably safe to continue the line into temperature ranges not determined, but at which operating temperatures might be in the sedimentation apparatus.

In order to determine kerosene viscosities it was necessary, as a starting point, to know the viscosity and density of pure water at the various temperatures under consideration. Recourse was had to handbooks and the International Critical Tables for this information.

A 0.1-second, stop watch and a good grade pycnometer for liquid density completed the requirements as far as the kerosene was concerned. Cement specific gravity was determined in the regulation manner with the Le Chatelier flask.

In order to simplify the calculations to some extent, the cement specific gravity for the various samples was considered to be the same, i. e., 3.032. The variation of any one sample from this figure was quite small.

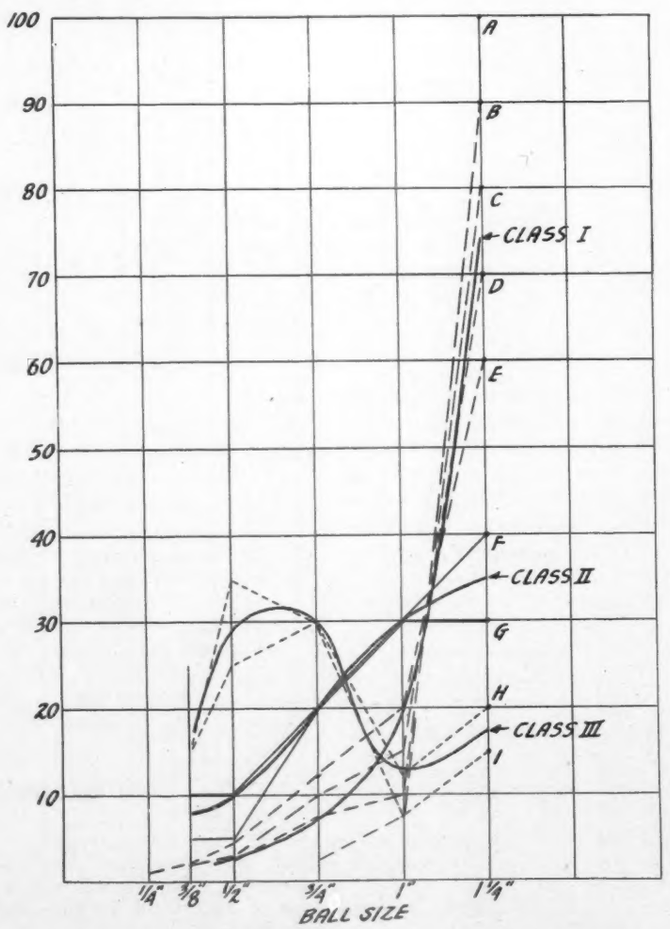


Fig. 4. Graph showing results of various mill charges

Use of Apparatus

When using the sedimentation apparatus, a sample of cement was dispersed in the settling tube and agitated with dry air. The time of settling in seconds was determined by the formula. Inasmuch as temperature of the settling medium is a function of viscosity, it was necessary to provide a means of determining this time element for any reasonable room temperature. This was accomplished by plotting a separate graph for each micron size to be determined, by which the settling time in seconds could be directly read from the graph for any temperature. By installing a thermometer through the top of the sedimentation tube, the time of settling could be varied at will for each settling period, to hold true as the kerosene temperature might vary.

In designing the apparatus, a minimum of rubber connections was aimed at, on account of the action of kerosene on rubber. This was made by using a burette tube, with 6-mm. glass stopcock delivering each charge of kerosene to the sedimentation tube, and an all glass siphon delivering to the burette.

The method of procedure is as follows: Two grams of the cement, which has been screened through a 20-mesh sieve, is weighed into a 250-ml. beaker. To this is added about 50 ml. of the kerosene, and the cement is dispersed by gentle stirring. With the pinch cock closed in discharge tube, and stopper in bottom of cone in place, all of the cement and kerosene is rinsed into the top of the sedimentation tube with a kerosene wash bottle. Sides of the tube are washed down. The tube is now set in place, and kerosene run in from the burette until the liquid meniscus reaches the top level mark. Air agitation is commenced through the drying bottle until the cement is thoroughly dispersed throughout the tube. When the agitation has been stopped, and as soon as the last air bubbles have reached the top of the liquid, the stop watch is started, temperature reading made, and from the graph for the size being determined is read the number of seconds the mixture is to stand. At the end of this time the pinch cock on the side discharge tube is opened and the liquid above the discharge level is run into a beaker. This carries with it the cement which, in the time allotted, has not had time to settle past the discharge level. The tube is now refilled with kerosene, agitated with air, and the process repeated until the liquid above the discharge level appears to be free of suspended material at the end of the settling time. Eleven repetitions were found necessary to clear the solution. After the

TABLE 1—MILL CHARGES—COMPOSITION OF GRINDING CHARGE BY PERCENT, SIZE MEDIA BY WEIGHT

Sample	1¼ in.	−1¼ in. +1 in.	−1 in. +¾ in.	−¾ in. +½ in.	−½ in. +⅜ in.	−⅜ in. +¼ in.	% voids in charge
A %	100.0	...	...	...	...	...	40.00
B %	90.0	7.5	2.5	...	...	...	36.09
C %	80.0	10.0	7.5	2.5	...	...	37.69
D %	70.0	15.0	10.0	3.0	2.0	...	36.95
E %	60.0	20.0	12.5	4.5	2.0	1.0	36.08
F %	40.0	30.0	20.0	5.0	5.0	...	37.29
G %	30.0	30.0	20.0	10.0	10.0	...	36.95
H %	20.0	12.5	30.0	25.0	12.5	...	37.69
I %	15.0	7.5	30.0	35.0	12.5	...	37.89

TABLE 2—PHYSICAL CHARACTERISTICS OF CEMENT SAMPLES

Cement sample	Normal consistency	——Setting Time—— Initial	Final	—Tensile strength— 7 Days	28 Days
A	24.0	1:55	3:55	345	377
B	24.1	1:40	4:00	327	367
C	24.7	1:50	4:15	380	382
D	25.0	2:10	4:00	357	393
E	24.7	2:40	4:50	367	377
F	25.3	2:20	4:10	358	375
G	25.8	1:50	4:00	368	370
H	26.6	2:00	4:00	395	395
I	26.5	2:40	5:20	407	420

last settling and discharge has been completed, a beaker is placed under the cone, the stopper drawn, and the cone and tube washed into the beaker with kerosene. The residue now in the beaker is filtered through a tared alundum crucible, and finally washed with petroleum ether. After drying, the material collected is weighed in the crucible, and its per cent of the original sample calculated. This is the material *above* the size which has already been discharged through the side tube. As each successive size is determined, the various fractions are readily calculated.

The computation of the surface area of any fraction from the data obtained is made by multiplying the fractional percentage, expressed in parts per hundred, by the reciprocal of the average particle size of the fraction in microns. This figure, in turn, is multiplied by the constant 600. The sum of the result of these computations gives the square centimeters area per cubic centimeter of cement. This is divided by the specific gravity of the cement to arrive at the square centimeters per gram of cement.

Ball Mill Charges of Grinding Media

In selecting ball charges for the laboratory mill no definite rule was followed. As may be seen from Table 1, a diminishing scale was applied to the large sizes and a correspondingly increasing scale to the smaller sizes. How well this selection was made may be judged from the chart and tables. The available media consisted of 1¼ in. Concavex, a quantity of worn balls of the same kind, and a few small, round balls. These were separated by screening into the various sizes until enough of each was available for the various calculated charges. Each mill charge was then made up on a percentage weight basis.

A sufficient quantity of normal clinker was set aside to complete all tests, but it was not considered necessary to make a chemical analysis of it. However, the analysis of clinker produced by this mill averages as to its major components: 51% C_3S, 23% C_2S, and 13% C_3A. All of this clinker was reduced through a laboratory crusher until its size approximated the same as that entering the finish compartment of the commercial mill. It was also thoroughly mixed before removing any for grinding. Each grinding charge consisted of 550 lb. of media, 18 lb. of clinker, and 14 oz. of gypsum. Three batches of cement were made on each sample, resulting in the production of approximately 55 lb. of cement for each sample. Each separate batch was ground 850 revolutions in the closed mill and discharged in 1000 revolutions.

The size grouping has been arbitrarily plotted for the media which indicates that the nine different grinds could be thrown into three major classes as indicated on the graph. The results obtained in surface area agree in a general way with this classification. Samples *A, B, C, D,* and *E* are of the first class; *F* and *G* of the second; *H* and *I* of the third.

The tensile strengths of the various samples are presented only as a matter of interest. It is believed that they do show a trend in the right direction, but as only a single set of specimens was made on each sample, the results can not be entirely reliable.

Table 2 illustrates how the increased surface area affects the physical properties of the cement. An appreciable change in normal consistency is noticeable, and here again the samples may be clearly grouped into three classifications, as were the mill ball charges. While it is commonly believed that an increase in fineness, as measured with the 200-mesh sieve, has no effect upon normal consistency, it must be quite evident that a change in surface area does affect the normal consistency.

There do not appear to be sufficient differences in setting times indicated, to warrant a definite statement. Setting times do appear to lengthen, as surface area increases. On the other hand, this might be a result of increased mixing water.

Table 3 shows the size distribution of the various samples and is self-explanatory.

Details Explained

Fig. 1 is a sectional sketch of the sedimentation tube and connections. This drawing is not made to scale, and is shown to particularly indicate the construction of the discharge take-off. The object aimed at is to remove the liquid above this point as rapidly as possible, without at the same time causing eddy currents below the horizontal plane, which might pick up material that has already settled below. The sharp, tapered upper edge of the circular tube is designed to allow settling particles to pass on into the cone. Even so, it is wise to tap the tube gently a few seconds before discharging, in order to dislodge any particles which may have remained on the slopes of the taper.

TABLE 3—DISTRIBUTION OF MICRON SIZES BY PERCENT WEIGHT OF SAMPLE

Sample	0-10 m	10-20 m	20-30 m	30-40 m	40-50 m	50-60 m	60-74 m	74-147 m	147 m
A	33.89	10.18	6.79	8.54	5.83	5.54	9.13	13.73	6.37
B	33.56	15.00	8.37	6.32	5.63	3.64	10.33	12.11	5.04
C	33.39	18.97	9.31	5.25	5.30	3.66	9.72	10.24	4.16
D	33.45	17.59	11.69	3.35	5.95	4.10	10.13	10.03	3.72
E	34.06	13.57	11.26	6.71	5.87	5.43	9.45	10.18	3.47
F	38.63	12.08	11.55	7.27	4.46	3.75	10.66	8.81	2.79
G	36.75	16.69	10.10	10.00	4.08	3.68	9.21	7.11	2.39
H	40.18	19.36	10.66	7.79	4.84	2.49	7.53	4.69	2.46
I	39.26	20.12	12.46	6.86	4.96	3.03	5.81	4.99	2.51

Sample	A	B	C	D	E	F	G	H	I
Sp. cm./c.c.	5103	5229	5349	5340	5306	5775	5716	6179	6121
Sp. Gr.	3.018	3.030	3.023	3.032	3.038	3.038	3.046	3.033	3.033
Sq. cm./gr.	1691	1725	1769	1761	1746	1901	1876	2037	2018

The cone-shaped bottom, or settling cone, is designed to bring all settled particles close to the mouth of the air agitation tube, so that they will be stirred back into the solution when the air is forced through. The bottom cork should fit snugly within the cone, so that the cement will not lodge in the corners and fail to be redistributed throughout the tube at each agitation. The least necessary number of agitations may be effected by designing the discharge point as low as possible in the tube. "Insalute" makes a very satisfactory cementing medium between glass and metal, as long as it is not in contact with water. It will have a tendency to soften and wash out, in that case.

The accompanying illustration, Fig. 2, shows the relative dimensions of the apparatus and its assembly. Any good tinsmith can make the cone, and the rest of the material is readily available from any laboratory supply house.

The illustration, Fig. 3, shows the set-up of the constant temperature bath for viscosity determinations.

Fig. 4 illustrates the graphical representation of mill charges.

Conclusions

The conclusions reached in this work clearly indicate that a radical change in the finish compartment mill charge from 100% 1¼ in. Concavex to a mixture of smaller sizes will result in improved quality cement. On the other hand, if the present quality of the cement is sufficiently good, this standard of quality may be held at this same level by reducing the time of grinding. In other words, an increase in mill production might be expected from a redesign of mill charge.

For their assistance and suggestions, acknowledgment is made to A. W. Hooton and C. R. Green.

References

[1]Paper before June meeting, 1932, of A. S. T. M.
[2]"Notes on Grindability."
[3]Trans. A. S. M. E., Alabama meeting, April, 1931.
[4]"Combustion," June-July, 1933.
[5]"Clinker Chat," Vol. 5, No. 1, page 6.
[6]"Rock Products," Vol. 35, No. 21, page 18.
[7]"Rock Products," Vol. 35, No. 15, page 22.

Illinois Probably Will Soon Have Silicosis Law

GOVERNOR HORNER of Illinois will call a special session of the legislature about the middle of September, and one of the purposes is to draft a state law to cover employers' liability for workmen's compensation in certain industrial diseases, principally silicosis.

According to A. L. Kirkpatrick, insurance editor, *Chicago Journal of Commerce*, "when the state supreme court convenes for its fall session in October, there will be on its calendar, at least one, and probably two, cases of occupational disease which have been carried up for final adjudication.

"There are now between 450 and 500 cases on record in which occupational disease is involved. For a time the state industrial commission followed the practice of holding them up, but of late has been setting the cases for hearing and then continuing them at the request of the parties in the case. Some 200 or 300 cases have been settled by compromise since the court decision last April holding that the employe has no right of action for damages.

"Among the cases still pending are many which will cost little or nothing to settle, it is pointed out, so that the actual accumulated liability against the employers of the state and their insurance carriers is not as great as has been supposed in some quarters. Those who have been following the situation the closest are not now inclined to take as pessimistic a view of the situation as that which prevailed during the early months of this year."

Temporary Rates Adopted for Silicosis Insurance in New York State

NEW YORK STATE Superintendent of Insurance, Louis H. Pink, has decided to approve temporary rates for a period of three months on dust hazards, effective September 1, due to the new act passed by the last legislature, amending the workmen's compensation law.

The superintendent has reviewed the experience available in several other states which include silicosis under the workmen's compensation law, and has carefully studied other factors and data, relevant to the compensation for silicosis.

The experience of other states indicates clearly that the cost of compensation for silicosis claims will be substantial.

Because of wide divergence of opinion as to the amount of such costs, the superintendent has decided to approve temporary rates for a period of three months. These rates are based upon the assumption that the affected factories and plants are standard risks which are well maintained and in which steps have been taken to prevent any extraordinary or unusual silicosis hazards. Recognition of the fact that some risks will be entitled to lower rates and others should bear higher rates, is given in the decision of the superintendent by a provision that departures from the approved rates may be made in individual cases by the rating board subject to the approval of the superintendent of insurance.

Because these are based to a large extent upon judgment rather than experience, the superintendent has decided that at the expiration of three months, a further review and study will be made with a view to making whatever modifications conditions at that time may require.

"It must be borne in mind by both industry and insurance carriers that the sudden transition which brings silicosis under the compensation law will require considerable experimentation before a final accurate rating basis can be devised," the superintendent said. "During the temporary period necessary to work out a satisfactory scientific plan, full coöperation on all sides is essential. The matter is of vital importance to the industries and workers affected as well as to the insurance carriers. The situation must be viewed primarily from its social aspects and if that be done, it is believed that the many problems which will arise during the next few months may be satisfactorily solved."

Under the first plan the superintendent has approved a basic rate of $4.63 (foundries) per $100 of payroll, with a contribution by the employer of $300 toward each claim involving disability lasting more than four months. These approved rates are approximately 42% lower than those filed by the compensation insurance rating board.

Under the second optional plan the employer would deposit a sum designed to take care of the accrued liability of previous years, together with a smaller premium rate for current insured liability. The basic foundry premium rate approved by the superintendent under this plan is $1.88 per $100 of payroll and deposit per capita of $64. This premium rate is 20% lower than the companies' proposal and the minimum deposit is one-half of the sum proposed by the rating board.

Corresponding changes have been made in the rates for other industries in which the silicosis hazard exists.

The insurance carriers originally submitted these two plans of coverage: The first plan consisted of a payroll rate for coverage in addition to which the employer would contribute $300 toward each award. Several examples of the rates proposed are as follows:

Class of Employe or Employment	Rate per $100 of Payroll
Foundry	$ 8.00
Quarrying and rock excavation	9.00
Silica grinding	12.00
Stone cutting and polishing	18.00
Sand or gravel digging	2.00

The second plan provided for a materially lower payroll rate plus a per capita deposit. Under this method the assured would receive a refund of the unused deposit after charging it with six-sevenths of the incurred losses up to $7400 per claimant. It is contemplated that in subsequent years the charge against the deposit for losses will be reduced in percentage and appropriate adjustments in rates made. Applied to foundry risks the payroll rate would be $2.35 per hundred dollars of payroll, plus a deposit of $127 per employe with a loading for expenses.

Crushed Stone

Martinsburg, W. Va.: Five striking quarry laborers, accused of attempting to dynamite the power line to a local quarry operation several weeks ago, have been apprehended and will be prosecuted.

"Open House"—Employes' Understanding and Goodwill

PROBABLY by this time all employers appreciate that a sympathetic understanding and the accompanying goodwill of their employes toward their business or industry is a priceless asset, especially in these days when business and industry are under fire and struggling for survival against government-imposed obstacles as well as "natural" ones.

There are doubtless many ways of cultivating employes' goodwill, the soundest one being to treat employes fairly, honestly and understandingly, without being paternalistic. Obviously, the larger the business institution the more difficult the task. Collateral ways to help include "open houses." Machinery manufacturers in Milwaukee, Wis., have had a series of them, the latest being that of the Bucyrus-Erie Co., so it is used for illustration.

Any rock products company, cement, lime, gypsum, crushed stone, sand and gravel, or what not, which is large enough to make employe relations a problem, has the same opportunity to hold an open house.

The day picked is usually a Saturday and the plant and equipment are dressed up for public inspection. Employes act as guides, and there may be as many "trimmings" in the form of ice cream, cigars, etc., as the company feels inclined to contribute. Also there may be explanatory signs, loud speakers, etc., in the different departments. The "public" which attends is largely composed of the wives, children, sweethearts and friends of the employes.

What has impressed the editor most when attending and reflecting on these open houses is that they are *the employes' day.* For one day, at least, the most humble employe feels all the importance of a general manager as he explains *his* plant and his work to his admiring family and his envious friends. For once in his life he has a pride of proprietorship.

Milwaukee machinery manufacturer holds "open house"

Few industrial plants are so interesting as the one we have taken as our example, but rock products processing is always interesting to the uninitiated; and maybe an occasional "open house" will help to maintain in a more presentable condition some of these plants. At any rate an open house provides an opportunity for employes to explain to their assembled families and friends their own importance in the world of industry; and consequently builds goodwill on a very fundamental human trait.

Industry News

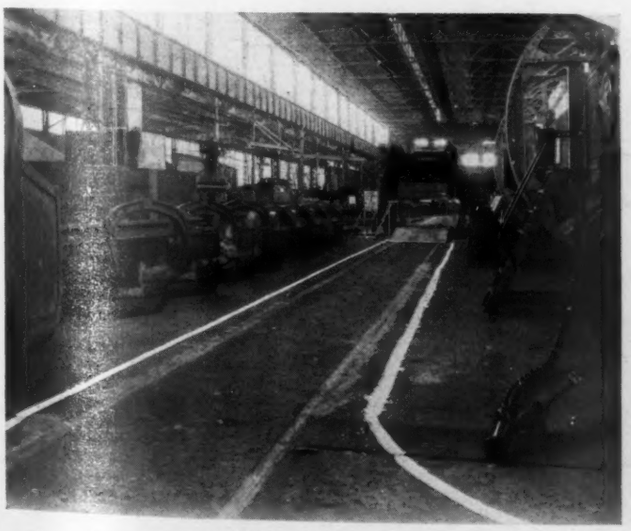
Quartzite Stone Co., Lincoln, Kan., has completed moving its crushing plant to a new location on a Union Pacific R. R. spur about one-half mile distant. The power plant remains at the old site and electric power lines carry the current to the electric-motored units of the new plant. Motor trucks are used to transport the rock from quarry to plant. The crushed stone of this plant is in demand for sewage filters.

◈ ◈ ◈

Howard Thomas, of the Fort Scott Hydraulic Cement Co., Fort Scott, Kan., has purchased the quarry and crushing plant of Thogmartin & Reis, north of the city, and will continue operation. T. L. Thogmartin is retiring from the firm of Thogmartin & Reis and it is being dissolved. Its principal business has been contracting.

◈ ◈ ◈

Oklahoma Portland Cement Co., Ada, Okla., is experimenting in the manufacture of dry ice or solid carbon dioxide made from dust free and purified stack gases, but is not in commercial production as has been widely published in newspapers served by the United Press.



Course of visitors through shops and yards marked out; loudspeakers employed to explain "the works"

Hints and Helps for Superintendents

Unique Handling Speeds Up Production at Gravel Plant

THE MONROE SAND AND GRAVEL CO., Monroe, La., is working a glacial hill deposit containing an average of about 50% gravel and 15% to 20% clay and the balance sand. This material is loaded with a Bucyrus 24, 4-yd., all-electric dragline. The overburden, which is an average of about 12 ft., is stripped and left in the pit. The gravel is hauled in 20-yd. Western, side-dump cars to a pond located close to the washing plant. This pond has a capacity of about 2000 cu. yd.

A 12-in. American Marsh pump, pumping through a 10-in. pipe line lying parallel with the tracks from which the cars are dumped has been installed. This 10-in. line paralleling the dumping ground, which is about 220 ft., has 4-in. pipe welded into the side toward the dump track. These pipes have individual valves so as to control the flow of water where needed, and the spray nozzle is made from 4-in. pipe flattened out and closed to a ¼-in. opening. This spreads the flow of water and thereby covers the entire surface along the dumping ground.

The reason for this procedure is that material which is loaded directly from the bank and dumped into this pond will not cave and a centrifugal suction pump will not pick it up. About four to ten cars in ten hours was about all that it was possible to produce until this washing process was installed, and since it has been installed sixty cars of sand and gravel have been loaded in ten hours. However, this is not an average loading capacity. Taking the average over a period of one year or more it would be somewhere around 30 cars of sand and gravel in 8 hours.

This washing process washes out about 90% of the clay contents in the material. This material piles up next to the track after a train has been dumped, and during the time that this train goes back to the dragline and reloads and comes back the material has all been washed down and the clay floats out into the pond, as it is lighter and takes longer to settle out of the water, and the sand and gravel wash down and level off in the pond.

In time, of course, the pond fills up with clay. When this happens the dredge boat is used to pump out the clay, which is easily pumped in the soft condition it rests in the pond. The sand and gravel is left in very loose condition and the pump and pipe line can be loaded to capacity. This is the reason for the above-average capacity obtained with the 10-in. Amsco pump.

H. C. Miller is superintendent.

Self-Starting Syphons

FIG. 1 SHOWS a self-starting syphon that can be used in the laboratory especially for distilled water. It consists of a copper tube *A* 1-in. in diameter and (for carboys) 15 in. long. To this tube is soldered a smaller diameter tube *B* which is provided with a hose and clamp (not shown). The copper tube is passed through a single-holed cork that fits snugly, but still so that the tube can be moved up and down. With the clamp on the hose shut, and if the copper tube is shoved downward, obviously there will be a pressure present in the tube at *B*. However, the device may be used with or without a clamp, and for practical purposes will function continually; starting and stopping by simply lowering or raising the copper tube.

View of pipe line parallel to tracks, equipped with spouts, to undercut material in sump

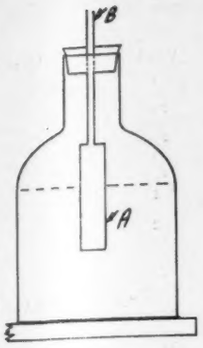


Fig. 1: Syphon for distilled water

The same device can be used for acids if acid proof material is used in its construction.

Fig. 2 is another self-starting syphon, which also can be used for a feeder of liquids, as its rate of flow can be controlled to a very fine degree. It consists of a cup *A* to which is soldered a threaded rod, so mounted that the assembly may be raised or lowered by the thumb-nut *F*. The tank *C* is provided with a float *E* and valve *D* so that the level of the solution in it may be kept at a fairly uniform level. The U-tube *B* completes the apparatus.

In operation the device functions as follows: The cup *A* is filled with liquid and remains full at all times. It is provided with an over-flow lip *G*. The U-tube *B* is now filled with solution as for ordinary syphoning and placed as shown in the sketch. When the cup *A* is in the position shown the liquid will flow continuously, but if the cup *A* is raised by the thumb-nut the *rate* of flow will diminish proportionately. And if the cup is raised so that the liquid level in it is *above* that in the tank *C*, the flow will stop. On lowering the cup the flow will automatically start again.

The tank *C*, instead of having a float valve to control the solution level, can be provided with an overflow lip and an excess amount of liquid flowed into it, thereby keeping the solution level uniform.

This device was used for feeding liquids at a specified rate which was roughly 2 gal. per minute, and repeated checking of the rate of flow showed it to be remarkably uniform. As the feeder has no moving parts it lends itself to cheap, consistent operation.

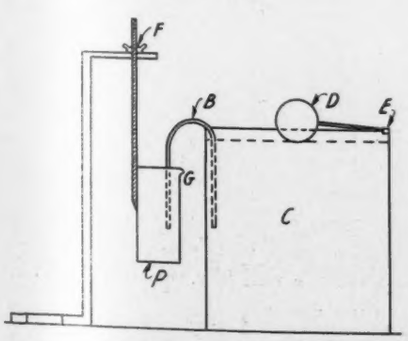


Fig. 2: Syphon for use as a feeder of liquids

Portable tool rack facilitates work at blacksmith shop

Blacksmith Shop Kinks

THE HANDLING of long drill steel in a blacksmith shop calls for special methods of handling. At one West Coast quarry shop the pieces of long drill steel are handled by means of simple carriers which ride a horizontal pipe, much like the old hay-carriers used on farms. There are several of these pipes mounted parallel to each other and each set of pipe is provided with a traveling bracket which supports the end of the drill steel away from the furnace. The traveling bracket rides the pipe by means of a small grooved wheel.

For convenience, the tools used for the various dressing operations, which are a part of the sharpening process, are carried on portable racks which can be moved about on the smooth floor of the shop. Thus no matter whether long or short steel is being sharpened the tools needed can be moved easily to the place of use. So by providing portability to the handling of the drill steel itself and portability to the tools used for dressing the steel, greater efficiency is obtained. The illustration shows the portable tool racks.

Saves Wear on Chutes

A NUMBER of examples of how to save chute wear by making the material in the chute serve as lining and take the wear have been described in these columns. The illustration herewith is an excellent example. The photograph was taken at the crushed stone plant of C. C. Beam, Inc., Melvin, Ohio.

The chute is made of sheet steel, all welded. Instead of the stone rushing down the steep angle of the completely enclosed box chute, with resultant wear and breakage of stone, the end of the diagonal chute is closed some few inches beyond the vertical down spout. This closed end, of course, partially fills with the stone, and acts as a cushion or buffer, so that the stream of material is not only slowed up, and its direction of flow changed, but segregation and breakage are also largely avoided.

Diagonal chute with closed end beyond down spout, to act as a buffer to slow up material and avoid segregation

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	8-15-35	4	6	
Allentown P. C., pfd.[47]	8-15-35	5½	7	
Alpha P. C., com.	8-23-35	16¼	16½	
Amalgamated Phos. 6's, 1936[47]	8-15-35	102½	103½	
American Aggregates, com.[48]	8-14-35	¾	1⅝	
American Aggregates, pfd.[48]	8-14-35	2	5	
American Aggregates, 6's 1st mtg. 3/6's, 1943, new bonds[48]	8-14-35	40	....	
American Aggregates, 6's, 1943, old bonds[48]	8-14-35	40	....	
American L. and S., 1st 7's[48]	8-14-35	102	....	
Arundel Corp., com.[48]	8-14-35	20	21	
Ashgrove L. & P. C., com.[49]	8-15-25	11	....	
Ashgrove L. & P. C., pfd.[49]	8-15-35	95	....	
Bessemer L. and C., Class A[47]	8-26-35	7	8	
Bessemer L. and C., 1st 6½'s, 1947[48]	8-14-35	40	....	
Bessemer L. and C., cert. of dep., 1947[46]	8-13-35	42	....	
Bloomington Limestone, 6's[47]	8-15-35	7	9	
Boston S. and G., new com.[37]	8-14-35	1½	3	
Boston S. and G., new 7%, pfd.[37]	8-14-35	6	8	
Boston S. and G., 7's, 1939[37]	8-14-35	70	....	
Calaveras Cement, com.[40]	8-11-35	¼	1¼	
Calaveras Cement, 7% pfd.[40]	8-11-35	40	....	1.00(accum.)Aug. 12
California Art Tile, A[9]	8-15-35	3	6	
Canada Cement, com.[42]	8-23-35	6¼	6¾	
Canada Cement, pfd.[42]	8-23-35	54½	56½	
Canada Cement, 5½'s, 1947[42]	8-23-25	103½	104	
Canada Crushed Stone, bonds[42]	8-23-35	95	....	
Canada Crushed Stone, com.[42]	8-23-35	5 nominal		
Certainteed Products, com.	8-23-35	5¾	5⅞	
Certainteed Products, pfd.	8-23-35	46½	48	
Certainteed Products, 5½'s, 1948	8-23-35	83¼	85	
Consol. Cement, 1st 6½'s 1941[47]	8-15-35	35	37	
Consol. Cement, pfd.[47]	8-15-35	3	4	
Consol. S. and G., pfd.[42]	8-23-35	25	....	
Consol. Rock Products, com.[47]	8-15-35	½	1	
Consol. Rock Products, pfd.[47]	8-15-35	1	2	
Consol. Rock Products, units[47]	8-15-35	2	3	
Construction Mat., com.	6-12-35	6c actual sale†		
Construction Mat., pfd.	6-12-35	12c actual sale‡		
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	8-15-35	20	25	
Coosa P. C., 1st 6's[47]	8-15-35	20	25	
Coplay Cement Mfg., pfd.[47]	8-15-35	12	15	
Coplay Cement Mfg., 6's, 1941[47]	8-15-35	73	76	
Cumberland P. C., 7's, 1937[47]	8-15-35	75	80	
Dewey P. C., com.[47]	8-15-35	35	40	
Dolese and Shepard	8-22-35	20	22	
Dufferin Pav. and Cr. Stone, com.[42]	8-23-35	2	....	
Dufferin Pav. and Cr. Stone, pfd.[42]	8-23-35	25	....	
Federal P. C., 6½'s, 1941[47]	8-15-35	15	20	
Fla. Port. Cement, 6½'s, 1937[46]	8-13-35	99½	100½	
Fla. Port. Cement, units[47]	8-15-35	21	22	
Giant P. C., com.[47]	8-15-35	3	5	
Giant P. C., pfd.[47]	8-15-35	11	13	
Gyp. Lime & Alabastine, Ltd.	8-23-35	5⅜	6	
Gyp. Lime & Alabastine, 5½'s, 1948[47]	8-15-35	92	95	
Hawkeye P. C., cap.[49]	8-15-35	29	....	
Hercules Cement, com.[49]	8-15-35	19	....	
Hercules Cement, 7% pfd.[49]	8-15-35	80	....	
Hermitage Cement, com.[47]	8-15-35	12	15	
Hermitage Cement, pfd.[47]	8-15-35	80	85	
Ideal Cement, 5's, 1943[47]	8-15-35	102	103	
Ideal Cement, com.[47]	8-15-35	40	41	
Indiana Limestone 6's[47]	8-15-35	10	12	
International Cement bonds, 5's, 1948	8-23-35	103	102½	
International Cement, com.	8-23-35	23¾	30	.25 (qu.) Sept. 30
Kelley Island L. and T.	8-22-35	16½	17½	
Ky. Cons. Stone, 6½'s, 1938[47]	8-15-35	20	22	
Ky. Cons. Stone, com.[47]	8-15-35	1	2	
Ky. Cons. Stone, pfd.[47]	8-15-35	2	3	
Ky. Cons. Stone, 1st mtg. 6½'s[48]	8-13-35	15	....	
Ky. Rock Asphalt, com.[46]	8-13-35	⅛	⅝	
Ky. Rock Asphalt, pfd.[46]	8-13-35	1	2	
Ky. Rock Asphalt, 6½'s, 1935[47]	8-15-35	30	35	
Lawrence P. C.	8-21-35	15½	17½	
Lawrence P. C., 5½'s, 1942[47]	8-15-35	100	101	
Lehigh P. C., com.	8-23-35	12¾	13⅞	
Lehigh P. C., 7% pfd.	8-23-35	100	101¼	.87½(accum.)Oct. 1
Louisville Cement[47]	8-15-35	80	85	
Lyman-Richey 1st 6's, 1935[47]	8-15-35	15	20	
Marbelite Corp., com. (cement pts.)[40]	8-11-35	¼	½	
Marbelite Corp., pfd.[40]	8-11-35	4	6	
Marblehead Lime, 7's, 1944[40]	8-13-35	75	85	
Marquette Cement, com.[47]	8-15-35	24	26	
Marquette Cement, pfd.[47]	8-15-35	95	100	
Marquette Cement Mfg. 1st 5's, 1936[47]	8-15-35	101	102	
Marquette Cement Mfg. 1st 6's, 1935[48]	8-12-35	100½	....	
Material Service Corp.[47]	8-15-35	4	6	
McCrady-Rodgers, com.[47]	8-15-35	6	8	
McCrady-Rodgers, 7% pfd.[47]	8-15-35	35	40	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Medusa P. C., com.[47]	8-15-35	17	18	
Medusa P. C., pfd.[47]	8-15-35	45	50	
Michigan L. and C., com.[47]	8-15-35	50	55	
Missouri P. C.	8-22-35	8½	8½	
Monarch Cement, com.[47]	8-15-35	75	85	
Monolith P. C., com.[9]	8-13-35	2	3	
Monolith P. C., 8% pfd.[9]	8-13-35	4	5	
Monolith P. C., units[9]	8-13-35	10	13	
Monolith P. C., 1st mtg. 6's[9]	8-13-35	100	101	
Monolith Portland, Midwest, pfd.[9]	8-12-35	1	2	
National Cement (Can.) 1st 7's[42]	8-23-35	101½	....	
National Gypsum A., com.[47]	8-15-35	17	17½	
National Gypsum, pfd.[47]	8-15-35	92	95	1.50 (accum.) Aug. 13
National Gypsum, 6's[47]	8-15-35	105	107	
National L. and S., 6½'s, 1941[47]	8-15-35	98	100	
Nazareth Cement, com.[47]	8-15-35	5	7	
Nazareth Cement, pfd.[47]	8-15-35	45	50	
Newaygo P. C., 7% cum. pfd.[49]	8-15-35	25	....	
Newaygo P. C., 1st 6½'s, 1938[48]	8-13-35	93½	95	
New England Lime, units[14**]	8-13-35	7	10	
N. Y. Trap Rock, 1st 6's, 1946	8-23-35	80	80	
N. Y. Trap Rock, 7% pfd.[40]	8-13-35	50	60	
North Amer. Cement, 1st 6½'s, 1953[47]	8-15-35	25	26	
North Amer. Cement, 6½'s, 1943[47]	8-15-35	88	90	
North Amer. Cement, 6½'s, 1940[47]	8-15-35	60	63	
North Amer. Cement, com.[47]	8-15-35	1	2	
North Amer. Cement, 7% pfd.[47]	8-15-35	2	3	
North Shore Mat. 1st 6's[47]	8-15-35	45	48	
Northwestern Port. Cem., units[9]	8-13-35	41	44	
Northwestern States P. C.[47]	8-15-35	17	20	
Ohio River S. and G., com.	8-23-35	....	2	
Ohio River S. and G., 1st pfd.	8-23-35	56	....	
Ohio River S. and G., 2nd pfd.	8-23-35	....	7	
Ohio River S. and G., 6's[46]	8-13-35	8	10	
Oregon P. C., com.[47]	8-15-35	3	5	
Oregon P. C., pfd.[47]	8-15-35	65	70	
Pacific Coast Agg., new com.[40]	8-11-35	1⅝	1¾	
Pacific P. C., com.[40]	8-11-35	2¾	3½	
Pacific P. C., pfd.[40]	8-11-35	40	42½	
Peerless Cement, com.[47]	8-15-35	½	1	
Peerless Cement, pfd.[47]	8-15-35	3	4	
Penn.-Dixie Cement, com.	8-23-35	3⅞	3⅞	
Penn.-Dixie Cement, pfd.	8-23-35	23⅝	26⅛	
Penn.-Dixie Cement, 6's A, 1941	8-23-35	91⅛	92⅞	
Penn. Glass Sand Corp., pfd.[47]	8-15-35	104	107	1.75 (accum.) Aug. 1
Penn. Glass Sand Corp., 6's[47]	8-26-35	106	107	
Petoskey P. C., 6's, 1941[48]	8-14-35	85	....	
Petoskey P. C., 6's, 1935-38[48]	8-14-35	88	....	
Petoskey P. C., com.[48]	8-14-25	3½	....	
Republic P. C., 6's, 1943[47]	8-15-35	95	97	
Riverside Portland Cement, A[9]	8-13-35	6½	7½	.20 (accum.) Aug. 1§
Riverside Portland Cement, B[9]	8-13-35	¾	....	
Riverside Portland Cem., pfd.[9]	8-13-35	95½	97	1.50 (qu.) Aug. 1
Rockland and Rockport Lime, 1st pfd.[47]	8-15-35	2	3	
Santa Cruz P. C., com.[9]	8-13-35	22½	30	
Schumacher Wallboard, com.[9]	8-13-35	1½	3	
Schumacher Wallboard, pfd.[9]	8-13-35	6	8	
Signal Mt. P. C., units[47]	8-15-35	36	38	
Signal Mt. P. C. 6's, 1926[46]	8-13-35	101	....	
Southwestern P. C., units[40]	8-11-35	200	....	
Spokane P. C., units[40]	8-15-35	7	....	
Standard Paving & Mat. (Can.), com.[42]	8-23-35	1¼	1⅝	
Standard Pav. & Mat., pfd.[42]	8-23-35	12	13	
Superior P. C., A[40]	8-11-35	25	30	.27½ Sept. 3
Superior P. C., B[40]	8-11-35	6½	....	
Trinity P. C., units[47]	8-13-35	17	20	
U. S. Gypsum, com.	8-23-35	63½	64½	.50 (qu. & ex.) Oct. 1
U. S. Gypsum, pfd.	8-23-25	150	157	1.75 (qu.) Oct. 1
Volunteer P. C., 1st 7's, 1942[49]	8-15-35	90	....	
Volunteer P. C., com.[49]	8-15-35	1⅞	....	
Vulcanite P. C., com.[49]	8-15-35	3	6	
Vulcanite 7½'s, 1943[49]	8-15-35	58	....	
Wabash P. C.[47]	8-15-35	8	10	
Warner Co., ww. 1st 6's[47]	8-15-35	38	40	
Warner Co., com.[47]	8-15-35	1	2	
Warner Co., pfd.[47]	8-15-35	3	5	
Whitehall Cement Mfg., com.[47]	8-15-35	35	40	
Whitehall Cement Mfg., pfd.[47]	8-15-35	60	70	
Wisconsin L. & C., 1st 6's, 1940[47]	8-15-35	50	55	
Wolverine P. C., com.[47]	8-15-35	3	4	
Yosemite P. C., A. com.[40]	8-11-35	2	2½	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14] The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbit, Thomson & Co., Toronto. [46]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plotz and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

† 60 shares sold at auction, at New York, N. Y.
‡100 shares sold at auction, at New York, N. Y.
§This leaves accruals of $4.28¾ per share.
*Reorganized, holders of 6% bonds due 1939 receiving 7% bonds due 1944.
**Reorganized, holders of 6% bonds due 1935 receiving one share of preferred stock and three shares of common stock for each $100 principal.

Recent Dividends Announced

Calaveras Cement Co., 7% cum. pfd.	$1.00	Aug. 12, 1935
International Cement, com. (quar.)	.25	Sept. 30, 1935
Lehigh Portland Cement Co., pfd. (accum.)	.87½	Oct. 1, 1935
Riverside Cement Co., pfd. (quar.)	1.50	Aug. 1, 1935
Signal Mountain Portland Cement, pfd. (accum.) (leaves arrearage of $56)	2.00	Aug. 15, 1935
Superior Portland Cement, A (accum.)	.27½	Sept. 3, 1935
United States Gypsum, com. (quar.)	.25	Oct. 1, 1935
com. (extra)	.25	Oct. 1, 1935
pfd. (quar.)	1.75	Oct. 1, 1935

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Universal Gypsum and Lime Co., Chicago, Ill., which is to be absorbed by National Gypsum Co., Buffalo, N. Y., reports an increase in 1935 net sales over corresponding month of 1934: March, 51.4%; April, 5.5%; May, 14.3%; June (estimated), 63.9%. Net sales increased approximately 31.8% in first 6 months of 1935 over first 6 months of 1934. Earnings, after depreciation and depletion, but before Federal taxes, 4 months to June 30, 1935: March, $13,694; April, $24,098; May (estimated), $20,000; June (estimated), $20,000; total, $77,791. Total assets were reported as of April 30, 1935, at $2,041,386; current assets $672,754; liabilities, $144,994.

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Missouri Portland Cement Co., St. Louis, Mo., reported for the years ended December 31:

	1934	1933
Gross sales	$2,561,116	$2,871,792
Less freight and discount	512,214	not stated
Net sales	2,048,902	.....
Cost of sales	1,277,003	.....
Selling, general and administration expenses.	413,447	.....
Other income (net)	2,656	.....
Net profits	361,108	199,791
Depreciation } Depletion }	355,715	{ 551,461 } 4,286
Contingent and operating reserve	25,000	.....
Net loss for year	*19,607	†355,957

*Before crediting earned surplus with $1,500,000 transferred from appropriated surplus through reduction of authorized stock and before debiting earned surplus with $1,534,328 reduction of book values of buildings and equipment in accordance with appraisals of Ford, Bacon & Davis, Inc. Also before crediting capital surplus with $428 discount on 167 shares treasury stock acquired.

†Before debiting $634,387 net book value of buildings and equipment of non-operating retail yards and gravel plant written off, adjustment of obsolete material and supplies, etc., and crediting $20,764 additional distribution received in liquidation of Standard Building Materials Co.

Note: Depreciation and depletion charges reduced in 1934 on account of adjustments to plant and property accounts (see * above).

Balance sheet as of December 31 showed:

	1934	1935
Total assets	$8,352,823	$9,897,058
Current assets	1,553,387	1,249,121
Current liabilities	31,998	41,211
Working capital	1,521,389	1,207,910

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United States Gypsum Co., Chicago, Ill., declared an extra dividend of 25c a share and the regular quarterly dividend of 25c a share on the common and the regular quarterly dividend of $1.75 a share on the preferred, all payable October 1 to stock of record September 13.

Medusa Portland Cement Co., Cleveland, Ohio, through J. B. John, president, has announced that a plan of refinancing approved July 18 by shareholders has been completed. "The management of the company is pleased to inform you," Mr. John wrote shareholders, "that as a result of the very gratifying support of the shareholders, as evidenced by the receipt of proxies representing 83.77% of the total outstanding shares, the plan of refinancing . . . has now been completed."

The plan provided for retirement of the present fixed indebtedness of the Medusa company and its subsidiary, the Newaygo Portland Cement Co. by authorizing $2,200,000 first mortgage and collateral trust convertible bonds.

The proceeds of the bonds were "proposed to be used for the retirement of such consolidated fixed indebtedness, to furnish working capital, and, if sufficient, to acquire outstanding minority interests of subsidiaries in order to effect a possible later complete consolidation."

As of July 1, 1935, according to a circular to shareholders, the consolidated fixed indebtedness of the company was $1,806,500, of which $337,000 bore interest at the rate of 6% and the remaining $1,469,500 bore interest at the rate of 6½%. Such indebtedness was to mature within a period of less than three years.

A syndicate of brokers is offering $2,200,000 of the new Medusa bonds (first mortgage and collateral trust convertible) at the following prices:

Maturity	Coupon Rate	Prices*
Oct. 1, 1936	3 %	98.85%
Oct. 1, 1937	3½%	98.95%
Oct. 1, 1938	4 %	98.50%
Oct. 1, 1939	4½%	98.10%
Oct. 1, 1940	5 %	100.00%
Oct. 1, 1941	5¼%	100.00%
Oct. 1, 1942	5¼%	100.00%
Oct. 1, 1943	5½%	100.00%
Oct. 1, 1944	5½%	100.00%
Oct. 1, 1945	5½%	100.00%

*Plus accrued interest to date of delivery.

The bonds mature annually October 1, 1936, to and including October 1, 1945, at the rate of $220,000 annually.

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Consolidated Cement Corp., Chicago, Ill.: Plan of reorganization dated October 8, 1934, as modified under date of December 26, 1934, was confirmed and ordered placed in effect on May 31, 1935, by the U. S. District Court, District of Kansas, Third Division. Officers: J. L. Senior, chairman; S. W. Storey, president; S. G. Stewart, A. E. Hjerpe, vice-presidents; H. Miller, secretary and treasurer. Directors: H. Allport, C. H. Bliss, R. J. Hurley, A. Z. Patterson, W. D. Pratt, W. B. Prickitt, J. L. Senior, S. G. Stewart, S. W. Storey and A. E. Swanson.

Directors have ordered payment on August 1 of 3% interest on the 15-year first mortgage 6% cumulative income bonds, as well as a 3% interest payment on the 15-year 6% cumulative income notes as provided for in the plan of reorganization.

International Cement Corp., New York City, and subsidiaries, report for the quarter ended June 30, 1935 (subject to year-end adjustments), net profit of $339,418 after depreciation, interest, reserve for income taxes and contingencies, etc., equal to 54c a share on 626,276 shares of capital stock, excluding 10,700 shares held in treasury. This compares with $115,602 or 18c a share in the preceding quarter and $297,076 or 47c a share in the June quarter of the previous year. For the six months ended June 30, 1935, net profit was $455,020, equal to 72c a share, against $346,973 or 55c a share in the first half of 1934.

EARNINGS STATEMENT

Three months to June 30:	1935	1934
Net sales	$3,864,781	$3,788,827
Manufacturing cost, including depreciation	2,452,172	2,400,144
General expenses, etc.	708,606	704,953
Operating profit	704,003	683,730
Interest, etc.	220,388	226,019
Reserve for contingency and taxes	144,197	160,635
Net profit	339,418	297,076
Six months to June 30:		
Net sales	6,649,727	6,641,444
Manufacturing cost, including depreciation	4,157,267	4,213,380
General expenses, etc.	1,326,208	1,535,872
Operating profit	1,166,252	1,092,192
Interest, etc.	441,617	443,149
Reserve for contingency and taxes	269,615	302,070
Net profit:		
March quarter	115,602	49,896
June quarter	339,418	297,076
Six months	$ 455,020	$ 346,972

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United States Gypsum Co, Chicago, Ill., and subsidiaries, report for six months ended June 30, 1935, shows net income of $1,627,477, after depreciation, depletion, federal income taxes, etc., equivalent, after dividend requirements on 7% preferred stock, to $1.14 a share.

Current assets as of June 30, 1935, including $14,059,596 cash and marketable securities, amounted to $21,239,412 and current liabilities were $1,817,835. This compares with cash and marketable securities of $13,526,545, current assets of $20,222,832 and current liabilities of $1,367,483 on June 30, 1934.

Consolidated income account for six months ended June 30, 1935, compares:

	1935	1934
Operating profit	$2,592,725	$1,887,426
Other income	207,914	298,188
Total income	$2,800,639	$2,185,614
Depreciation and depletion	942,145	903,149
Miscellaneous deductions	16,809	30,787
Income taxes	214,208	110,010
Net income	$1,627,477	$1,141,668
Preferred dividends	273,777	273,777
Common dividends	596,031	594,197
Surplus	$ 757,669	$ 273,694

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Calaveras Cement Co., San Francisco, Calif., resumed payment of dividends by declaration of a dividend of $1 a share on the 7% cumulative preferred stock, payable August 12 to stock of record August 5. This will be the first payment on the preferred since January 15, 1934. As of June 30, last, there were accumulated dividends of $10.50 a share on the 7% preferred, which amount will be reduced to $9.50 a share by the August payment.

Rock Products News Briefs

Sand and Gravel

Southwest Sand and Gravel Co., Pyatt, Ark., has completed its new plant on Crooked Creek. C. D. Denton, Springfield, Mo., is president, and C. J. Denton, Pyatt, superintendent. This plant is all-steel construction and is electrically powered. Initial power is supplied from a 160-hp. Diesel engine which drives a 137-kw. electric generator. Besides supplying quality sand for general construction, four classifications of gravel and a quantity of ballast material are turned out. The gravel produced is largely in demand by the highway departments of Arkansas and Missouri, as well as for street paving and building purposes. Material is delivered by a dragline to the plant's belt conveyor. The gravel pit is some 600 ft. in width and nearly a mile long, having a depth of 15 to 20 ft. A force of six experienced men turns out 40 tons per hour. A spur track of 1000 ft. is being constructed from the Missouri Pacific's White River main line to the plant.

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National Sand and Gravel Association, Washington, D. C., has resumed publication of *The Bulletin* in mimeograph form. The current issue contains much Washington news of interest to the industry and short items on research. In announcing resumption of publication it is stated: *"The Bulletin* will be made available only to member companies rather than to the industry as a whole, and its purpose will be to afford the Association a regular and convenient medium for informing its membership of those national events and developments which concern their operations in a direct and indirect manner. Reference will be made to Association activities, and the progress of work will be charted from time to time. National legislation affecting the industry will be analyzed; activities of the executive department of the Federal Government, in which our industry is involved, will be described; and information which we consider of general value to the membership will be referred to in the columns of *The Bulletin."*

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Greenville Sand and Gravel Co., Greenville, Miss., whose dredge *Millie Frey* burned and sank in the Mississippi River a year ago, recently purchased a new all-steel hull (40x168 ft.) from the U. S. government and the pump and equipment salvaged from the sunken dredge will be installed on it.

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Riverside Sand and Gravel Co., Grand Rapids, Mich., is the present name of the former Kent Gravel Co. D. Van Dam is owner. A Telsmith gyratory crusher was recently added to crush oversize.

Reinhold & Co., Inc., Pittsburgh, Penn., has secured a contract for Allegheny River sand and gravel from the York Engineering & Construction Co., of York, Penn., general contractors for construction of lock and dam No. 9 at Rimerton in Armstrong county. The tonnage is approximately 250,000, and shipment will be from the plant of the Allegheny River Sand Corp., which is located in the northern section of Armstrong county.

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Crushed Stone

Rockford Stone Co., Rockford, Ohio, has added a pulverizing plant for producing air-separated, fine dolomite dust. A Raymond kiln mill, which dries as well as pulverizes, is used.

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Kittanning Limestone Supply Co., Ford City, Penn., it is reported, will build a distributing plant, for storage and loading, on state highway No. 422, soon to be rerouted in this locality.

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El Paso, Tex.: Local crushed stone producers are vigorously fighting a proposal of the county commissioners to purchase a crusher and establish a county plant. This locality is amply equipped with commercial plants begging for orders.

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Pacific Coast Aggregates, Inc., San Francisco, Calif., has purchased the Basich Brothers' crushed stone plant near Lemon Cove.

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Grant-Service Rock Co., Fresno, Calif., is erecting a distributing plant at Selma on property of the Southern Pacific Co.

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Heumader Quarries, St. Joseph, Mo., Wm. Heumader, owner, operates a modernly equipped limestone and crushing plant —has its own electric power generating plant, driven by a Diesel engine. The plant has a capacity of 800 tons per day. It has the distinction of being probably the only *landscaped* crushed stone operation in the world. A local newspaper describes the plant as follows: "Last spring 500 pine trees were planted at regular spaces throughout the hills. Large stone cliffs, other trees and untouched boulders add beauty to the site. Around the power house shrubbery has been planted. This shrubbery will weave among the rocks, it is said. Rose bushes also are planted near the quarry buildings. A large flower garden, surrounded by a native rock wall is located in front of the home of the night watchman, near the engine building. Mr. Heumader said that he has turned thumbs down on any stone salvaging work that tends to mar the natural beauty of the land. Landscaping has been the quarry owner's hobby since he was a child. When he was a boy his time was spent building pools, miniature winding roads and rock gardens to beautify the lawn at his home. Probably the highest point on the bluff is located about 200 yards north of the quarry buildings. At that point is a solid rock ledge. According to the present plans, the quarry owner will erect a large stone mansion on this peak with the front porch aligned with the edge of the cliff, so that visitors may stand on the porch and view the surrounding territory for miles.

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Silica

Portage Silica Co., Youngstown, Ohio: A considerable amount of personal property, consisting largely of mortgages and promissory notes of officers and subsidiaries, was seized and offered for sale at public auction, August 28, by the Collector of Internal Revenue for unpaid federal taxes.

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Ohio Quartz Products Co., Jackson, Ohio, lost its entire plant by fire August 1. It may not be rebuilt. The company was organized in 1930 and the first unit of the plant was completed by the following year. Its business was to make a high grade silica brick. But the original plans were never carried out. The company was not fully financed and silica brick were never manufactured, although one kiln was completed and three remained unfinished.

Meanwhile the company had been producing sand and gravel for filtration materials and gave employment to about 20 men under the supervision of Harry Farrar. D. S. Parry, Chillicothe, is president and treasurer of the company. Plans had been formulated to reorganize the company with a capital stock of $250,000 authorized, and to complete the brick kilns and get into the actual business of making brick. The slack market of the last five years had discouraged such efforts in the past. Several Jackson business men owned stock in the Ohio Quartz Products Co.

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Western Silica, Ltd., has been organized in Canada to develop a deposit of non-crystalline or amorphous silica about 10 miles from Minaki, Ont., on the shore of Lake Vermilion. The silica was found with a deposit containing pure sulphur and a sillimanite. The upper strata of the deposit contain red and yellow materials suitable for paint coloring, the yellow also having commercial uses as a gas filter.

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Bentonite

F. E. Schundler, Joliet, Ill., recently inspected bentonite deposits near Basin, Wyo., and is reported by local newspapers to have said it was the best material ever examined. He is reported as saying he expected to contract for a large amount, which he thinks could be successfully exploited. Mr. Schundler operates grinding plants in various parts of the country.

Rock Products News Briefs

Cement

Statistics: The portland cement industry in July, produced 8,021,000 bbl., shipped 7,813,000 bbl. from the mills, and had in stock at the end of the month 23,291,000 bbl. Production in July showed a decrease of 1.5% and shipments a decrease of 1.1%, as compared with July, 1934. Stocks at mills were 6.6% higher than a year ago. The statistics here given are compiled from reports for July, received by the Bureau of Mines, from all manufacturing plants except one. The mill value of the shipments, 31,934,000 bbls, in the first half of 1935, is estimated at $49,317,000. According to the reports of producers the shipment totals for the first half of 1935 include approximately 945,000 bbl of high-early-strength portland cement with an estimated mill value of $1,812,000. In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 162 plants at the close of July, 1935, and of 163 plants at the close of July, 1934.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	July		June,	May,	Apr.,	Mar.,
	1934	1935	1935	1935	1935	1935
The month.	35.7	35.3	39.6	36.1	27.9	18.9
The 12 mos. ended ...	26.9	27.7	27.7	27.7	27.9	28.0

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Universal Atlas Cement Co., Universal, Penn, recently re-dedicated the Portland Cement Association safety trophy, won for a perfect year of safety in 1934, and a group of "old-timers," whose total length of service amounts to 577 years, was the center of attraction. Shown in the photograph are: Left to right, Fred Hann, Herbert Lord, Roy L. Slocum, David W. McFadyen, John Conlon, Nick Boichan, Joseph Strejcek, Thomas Blaskovitch, Luman F. Wittenberg, George Buckingham, Lawrence F. Doyle, John J. O'Malley, Fred Smith, Edmund D. Barry, John Campbell, William J. Bain, Ernest H. Loveday, Andrew J. McFarland, John Piposzar, George Koscso and John Dobos.

Huron Portland Cement Co., Detroit, Mich., has started construction of six concrete storage silos and a packing and distributing plant at Saginaw, Mich. The capacity will be 50,000 bbl. According to R. Earl Canole, superintendent of the Huron's Saginaw plant, the Saginaw storage center is the eleventh constructed by the company to provide ready distribution for the company's product. The other ten storage plants are at Alpena, Detroit, Muskegon and Wyandotte, Mich.; Duluth, Minn.; Milwaukee, Wis.; Cleveland and Toledo, O., and Buffalo and Oswego, N. Y.

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Los Angeles, Calif.: "Based on net selling prices at mills, the southern California cement market is at present depressed below any other in the United States," according to the *Pacific Coast Edition of the Wall Street Journal* (San Francisco). An abstract of a recent article continues: Mill prices in the southern California basin range from $1.24 to $1.32 per bbl., or 50 to 75c below other markets west of the Rocky Mountains, which, generally speaking, are in a corresponding position from the standpoint of production costs. As compared with the average mill base price of the larger eastern market areas, the southern California price is lower by 30c per bbl. and more. Northern California mill base prices average about $1.80, and in Oregon and Washington the average is above $2. All these prices are net at mills. The highly competitive condition in the cement-industry is illustrated by the 8c spread in the mill base prices at southern California mills. It is apparent that, although prices of cement from different manufacturers will be identical at any given market at the same time, which has been the subject of much discussion because of the uniformity, the place of competition between manufacturers is not at the market but at the mill. The usually uniform price at any market, instead of indicating lack of competition, actually is the result of keen competition between manufacturers. While each seller may quote the same delivered price, each probably gets a different mill price, and the manufacturer farthest from the market receives the smallest mill price for his product. The mill base prices of most eastern cement producing centers in the United States, with discounts figured off, are given below:

Hudson, N. Y.	$1.65
Buffalo, N. Y.	1.65
Cleveland, Ohio	1.55
Universal Penn.	1.55
Northampton, Penn.	1.55
Norfork, Va.	1.66
Kosmosdale, Ky.	1.65
Toledo, Ohio	1.55
Speeds, Ind.	1.65
Ironton, Ohio	1.50
Limedale, Ind.	1.60
Mitchell, Ind.	1.60
Buffington, Ind.	1.60
La Salle, Ill.	1.60
Richard City, Tenn.	1.90
*Saginaw, Mich.	1.40
*Wyandotte, Mich.	1.35
Union Bridge, Md.	1.65
Hannibal, Mo.	1.60
Cape Girardeau, Mo.	1.60
Manitowoc, Wis.	1.70
Mason City, Iowa	1.60
St. Louis, Mo.	1.60
Sugar Creek, Kan.	1.60

* Michigan only.

It is obvious from the foregoing that southern California cement mills are operating on a much lower profit margin than is obtained in other sections of the United States. This in itself is a hopeful sign that the next move in price levels will be upward. In the last year there have been two major price reductions in southern California, one of 20c and another of 11c, making a total of 31c a barrel. Profits for some companies at present prices are out of the question unless sales can be built up to a point where the larger production will permit operating economies.

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Spokane Portland Cement Co., Irvin, Wash., about the middle of August, completed installation of the first Lepol preheater, or pre-calcinator, equipped cement kiln in this country.

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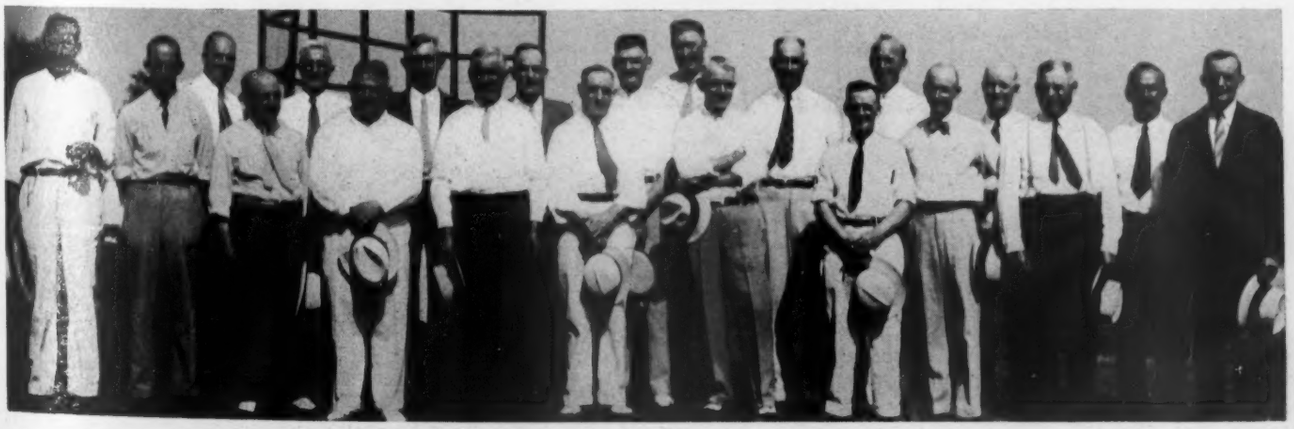
Ash Grove Lime and Portland Cement Co., Kansas City, Mo., has installed teletypes at the home office and the Chanute, Kan., plant office for transmission of orders and interoffice communications.



Universal Atlas Cement Co. "old-timers"—total length of service 577 years

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of August 17:

New England

36407. **Crude feldspar,** minimum weight 50 net tons, Keene, N. H., to Ogdensburg, N. Y. Proposed—$2.40 net ton. Reason—To permit movement for forwarding by water to plant at Toledo, O., which would otherwise be secured in Canada and move entirely by water to Toledo.

696–1B. To establish rates on **broken or crushed limestone,** minimum weight 60,000 lb., from New England origin points to Trunk Line destinations on same basis as on ground or pulverized limestone, all existing commodity rates at variance with this basis to be canceled.

Trunk

Sup. 1 to 33819. **Roasted dolomite** (refractory dolomite in granular form, treated or untreated, clinkered and/or burned to a dead state), carload, (See Note 2), to Lima, O., from Union Stone Co. and Billmyer, Penn., $2.55 and from Blue Bell, Penn., $2.85 per net ton, subject to emergency charge.

33819 (Sup. 2). **Roasted dolomite** (refractory dolomite in granular form, treated or untreated, clinkered and/or burned to a dead state), C. L., and **roasted calcite,** in granular form, treated or coated, clinkered and/or burned to a dead state, C. L., (See Note 2), from Williams, Penn., to Lima, Ohio, $2.85 per net ton, subject to emergency charge.

33853. **Rubble stone,** C. L., minimum weight 50,000 lb., from Grove, Md., to Georgetown, D. C., $1.13 per net ton, subject to emergency charge. The proposed rate compares favorably with rates from Engle and Martinsburg, W. Va.

33862. **Stone, natural (other than bituminous asphalt rock),** crushed, C. L., Catskill, N. Y., to West Hurley, Edgewood, Kaaterskill, Arkville, Stamford and Oneonta, N. Y., and various other stations on the Catskill Mountain Branch of the New York Central Railroad, rates ranging from 95c to $1.45 per net ton. Subject to emergency charge.

33865. **Crushed or ground slate, also slate dust and flour,** C. L., minimum weight 50,000 lb., from Whiteford, Cardiff, Md., Delta and Slate Hill, Penn., to Cly, Penn., 8c per 100 lb., subject to emergency charge.

33866. **Ground ganister stone,** C. L., from Clearfield, Penn., to Mt. Union, Penn., $1.43 per net ton, subject to emergency charge. Proposed rate is comparable with rate in reverse direction.

33868. **Sand** (other than ground or pulverized or naturally bonded moulding) and **gravel,** in open top cars, without tarpaulin or other protective covering, C. L., (See Note 2), from Holtwood, Penn., to Middleport, Penn., $1.40 per net ton subject to emergency charge. Proposed rate is comparable with rates from Burnham, Penn., to Jefferson and Brookside, Penn.

33874. **Marble or stone chips or granules, also marble or stone dust,** C. L., from Cardiff, Md., to Brooklyn and New York stations, N. Y., 16½c per 100 lb., subject to emergency charge. Minimum weight 50,000 lb. Reason: Proposed rate is comparable with rates on crushed slate between same points.

33877. **Crude fluxing limestone,** C. L., from Reading Co. and Pennsylvania R. R. stations Bridgeport, Mill Lane, Williams, Blue Bell, Knickerbocker, Rambo, Annville, Swatara, Bainbridge and Union Stone Co., Penn., and various other points to Bridgeton, N. J., rates ranging from $1.25 to $1.65 per net ton. Subject to emergency charge. Reason: Proposed rates are comparable with rates on ground limestone.

33878. **Slag, commercial, crushed,** C. L., (See Note 2), from Johnston, Penn.:

To	Per Net Ton
Cumberland, Md.	$1.10
Harpers Ferry, W. Va.	1.50
Washington, D. C.	1.70
Wilmington, Del.	1.80
Philadelphia, Penn.	1.80
Trenton, N. J.	1.90
Baltimore, Md.	1.70
Chester, Penn.	1.80
Cly, Penn.	1.50
Marcus Hook, Penn.	1.80
New Brunswick, N. J.	2.00

33885. **Talc,** C. L., minimum weight 40,000 lb., from Emeryville, Hailesboro, Natural Bridge and Talcville, N. Y., to Georgetown, Ont., 29c per 100 lb., subject to emergency charge. Reason: Proposed rate is comparable with rates to Toronto, Ont.

33888. **Stone,** viz., fire, ganister, not ground, C. L., (See Note 2), from Barree, Brookes Mills, Flowing Spring, Hannah, Harbison-Walker Refractories Co. No. 16, Madley, Moores Mills, Mt. Union, Reedsville and Wilfsburg, Penn., to Sandusky, O., $2.90 per net ton, subject to emergency charge. Reason: Proposed rate compares favorably with rates on fire brick from Cumberland, Md., and Madley, Penn.

33908. **Crushed stone,** C. L., minimum weight 8,000 lb., from St. George to Tottenville, Clifton, South Beach and Arlington, N. Y., 60c per net ton, subject to emergency charge.

Central

43645. To establish on **crushed stone, slag** and/or **gravel,** coated with oil, tar or asphaltum, in open top equipment, to following Pennsylvania points, in cents per 100 lb.: New Castle, 83; Harbor Bridge, 83; Pulaski, 83; West Middlesex, 73; Sharon, 73; Sharpsville, 73; Transfer, 73; Greenville, 73; Kennard, 83; Atlantic, 83; Stony Point, 83; Geneva, 93; Oil City, 103; Reno, 103; Sugar Creek, 93; Utica, 93; Carlton, 93; Cochranton, 93; Shaws, 93; Meadville, 93; Saegertown, 103; Venango, 103; Cambridge Springs, 103; Millers, 103; Mill Village, 103; Union City, 103; Corry, 113; Columbus, 123; Lottsville, 123; Bear Lake, 123.

43676. To establish on **stone,** fluxing, furnace or foundry, melting and/or refractory (unburned), in bulk, carload, from Lorain, O. (ex–lake) to Youngstown, Warren, 80c; Canton and Massillon, O., 90c per gross ton, subject to emergency charge. Route: Via B. & O. R. R. direct.

43687. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica), and **gravel,** in open top cars, carload, from Columbus, O., to West Jefferson, O., 40c, and London, O., 45c per net ton to expire December 31, 1935. Route: Via P. R. R. direct.

43692. To establish on **crushed slag** or **crushed commercial slag** (other than granulated), in open top cars, C. L., from Hamilton, O., to Marion, O., 115c per net ton.

43713. To establish on (a) **crushed stone,** in open top cars; **crushed stone screenings,** in open top cars; **agricultural limestone,** unburned, in open top cars, and (b) **limestone,** agricultural, ground or pulverized, unburned, minimum weight 60,000 lb., from Ridgeville, Ind. (Rates in cents per net ton):

To	Proposed Rates (a)	(b)
Dayton, O.	95	120
Xenia, O.	101	140

Route—Via P. R. R. direct.

43737. To establish on **refuse grinding sand,** carload, minimum weight when in box cars 60,000 lb., when loaded in open top equipment, (See Note 2), from Toledo, O., to points in Michigan on the A. A. R. R., I. C. C. Docket 20039 scale on agricultural limestone in box cars, also open cars, subject to minimum rate of 85c when in open cars and 95c when in box cars.

43738. To establish on **refuse grinding sand** in box cars, carload, from Toledo, O., to Ann Arbor, Mich., 105; Bad Axe, Mich., 155; Battle Creek, Mich., 145; Bay City, Mich., 150; Benton Harbor, Mich., 165; Big Rapids, Mich., 160; Cadillac, Mich., 170; Caseville, Mich., 160; Cheboygan, Mich., 190; Clare, Mich., 155; Flint, Mich., 140; Gaylord, Mich., 180; Grand Rapids, Mich., 155; Grayling, Mich., 170; Jackson, Mich., 125; Kalamazoo, Mich., 150; Lansing, Mich., 140; Manistee, Mich., 180; Monroe, Mich., 75; Muskegon, Mich., 165; Petoskey, Mich., 185; Port Huron, Mich., 140; Traverse City, Mich., 180, being proposed rates in cents per net ton.

43745. To establish on **dolomite,** roasted (refractory dolomite, in granular form, treated or untreated, clinkered and/or burned to a dead state), carload, minimum weight 60,000 lb., to Johnstown, Penn., from Bettsville, Maple Grove, Martin, Narlo and Woodville, O., 194c per net ton.

43757. To establish on **slag,** commercial, crushed (a product of iron and steel blast or open hearth furnaces), carload, minimum weight 80% of marked capacity of car, from Youngstown, O., to East Palestine, O., 65c per net ton. Route: Via P. R. R. direct.

43785. To establish on **gravel** and **sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing loam, moulding or silica, in open top cars, carload, (See Note 3), from Massillon, O., to Wampum, Penn., 100c per net ton. Route: Via P. R. R. direct.

43786. To establish on **breakwater stone,** (See Note 3), but not less than 50,000 lb., from Bedford, Ind., district to Kewaunee, Wis., 250c per net ton.

43824. To establish on **stone,** rip rap, ruble and quarry scrap, carload, from Annandale, Goff and Hilliards, Penn., to Vandergrit, Penn., 113c per net ton, plus emergency charge. Route: Via B. & L. E. R. R., Butler, Penn., and P. R. R.

43825. To establish on **crushed stone, stone screenings** and **agricultural limestone,** unburned in bulk, in open top cars, from Ridgeville, Ind., to Wabash, Ind., 90c net ton. Route: Via P. R. R., Marion, Ind., C. C. C. & St. L. Ry.

43827. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica) and **gravel,** in open top cars, carload, (See Note 3), from Black Rock and Buffalo, N. Y., to Frewsburg, N. Y., 90; Fentonville, N. Y., Akeley, Russell, Warren, Penn., 100; Youngsville, Pittsfield, Grand Valley, Penn., 110; Fieldmore Springs, Titusville, Penn., 120, being proposed rates in cents per net ton.

43842. To establish on **stone,** crushed; **slag** and/or **gravel,** coated with oil, tar or asphaltum, in open top cars, in straight or mixed carloads, from Wheatland, Penn., to destinations on the P. & L. E. R. R. and P. R. R. in Pennsylvania, rates as shown. Note: The oil tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so certify on shipping orders or bills of lading. Routes: Via P. & L. E. or P. R. R. direct. To (Representative Penn. points): Albion, 93; Althem, 133; Belle Valley, 113; Brant, 93; Butler, 123; Clarendon, 143; Colza, 123; Conway, 93; Coulson, 93; Dotter, 143; Edenburg, 83; Emlenton, 143; Farrell, 73; Foxburg, 133; Freedom, 93; Hillsville, 83; Hydetown, 133; Jackson Center, 93; Jamison, 143; Koppel, 83; Magee, 143; Merrill, 93; Milburn, 83; New Bethlehem, 143; No. Girard, 103; Pennside, 93; River Ridge, 143; Rochester, 93; Sharpsville, 73; Sheffield, 143; Smith's Ferry, 93; Struthers, 133; Tidioute, 143; Tryonville, 133; Warren, 133; West Hickory, 143; West Pittsburgh, 83.

43846. To establish on **crushed stone, slag** and/or **gravel,** coated with oil tar or asphaltum as described in Item 330 of N. Y. C. R. R. Tariff I. C. C. LS–1739, from Wheatland, Penn., to points on the N. Y. C. R. R., viz.: Ashtabula, O., 103; Carson, Dorset, Andover, O., 93; Osgood, Stoneboro, Sandy Lake, Penn., 98; Jamestown, Penn., 93; Franklin, Penn., 108; Oil City, Penn., 118; Williamsfield, Latimer, Wick, O., 83; Doughton, Youngstown, Hubbard, Bentley, O., Farrell, Sharon, Sharpsville, West Middlesex, Penn., 73, being proposed rates in cents per net ton. Routing: Via N. Y. C. R. R. direct.

43847. To establish on **sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica, and **gravel,** in open top cars, carload, from South Lebanon, O., to Dry Ridge and Williamstown, Ky., 90c per net ton. Route: Via P. R. R., Cincinnati, O., Sou. Ry.

43852. To establish on **agricultural limestone,** unburnt, C. L., from Piqua, O., to Pontiac, Mich., 160c, in closed equipment, minimum weight 60,000 lb., and 144c per net ton, in open top equipment. (See Note 3).

43854. To establish on **crushed stone** and **crushed stone screenings,** in bulk, in straight or mixed carloads, in open top cars, from White Sulphur and Scioto, O., to Ashland, O., 95c per net ton.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

43858. To establish on **limestone,** unburnt, ground or pulverized, C. L., min. wt. 60,000 lb., from Marble Cliff, O.

(Rates in cents per net ton)

To	Proposed
Dundee, Mich.	165
Grand Rapids, Mich.	225
La Fayette, Ind.	195
Richmond, Ind.	150
Fort Wayne, Ind.	165

Route: To Dundee—via P. R. R.-Toledo-Ann Arbor. To Grand Rapids, Richmond and Fort Wayne—P. R. R. direct. To La Fayette—P. R. R.-Logansport-Wabash R. R.

43859. To establish on **crushed stone, stone screenings** and **agricultural limestone,** unburned, in bulk, in open top cars, C. L., from Ridgeville, Ind., to La Gro, Ind., 110c per net ton. Route: Via P. R. R.-Fort Wayne, Ind.-Wabash R. R.

43865. To establish on **crushed slag,** C. L., from Hamilton, O., to Terre Haute, Ind., 130c per net ton.

43867. To establish on **limestone,** unburned, agricultural (in bulk, in open top cars), and **agricultural limestone screenings,** in open top cars, C. L., from Spore, O., to Valley City, O., 100c per net ton. Route: Via N. Y. C. R. R., Fostoria, O., B. & O. R. R.

43875. To establish on **sand,** building or core, C. L., from Black Rock and Buffalo, N. Y., to Elmira, Ont., 13c. Routing—G. T.-C. N. R. R.

43878. To establish on **stone,** natural or cast, C. L., as described, and subject to minimum weight in Agent B. T. Jones' Tariff 539, Item 10, from points in Indiana, as provided in C. F. A. Tariff 539, to Chisholm, Minn., same as to Chisholm Junction, Minn., to Tower, Minn., same as to Winton, Minn. Routing—Via usual available routes.

43886. To establish on **stone, rip rap, rubble** and **quarry scrap,** in straight or mixed C. L., from Harvest Hill, O., to Marion, O., proposed rate, 189c net ton; to Springfield, O., proposed rate, 176c net ton. Route—Via P. R. R. direct.

43887. To establish on **stone, rip rap, rubble** and **quarry scrap,** in straight or mixed C. L., from Harvest Hill, O., to Donnellsville, O., 176c net ton. Route—P. R. R., Springfield, O., C. C. C. & St. L. Ry.

43902. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica), and **gravel,** in open top cars, C. L., from Wolcottville, Ind., to Hoagland, Ind., 75c net ton, 49.9 miles. Route—P. R. R. direct.

43912. To establish on **dolomite, roasted** (refractory dolomite, in granular form, treated or untreated, clinkered, and/or burned to a dead state), C. L., minimum weight, from Bettsville, Maple Grove-Narlo, Woodville, O., to Muncie, Ind., $2.10; Zanesville, Lancaster, O., $1.69, Charleston, W. Va., $1.94 net ton.

43919. To establish on **sand and gravel,** minimum weight 50,000 lb., from Neville Island, Penn., to McKees Rocks, Penn., 50c per 100 lb. No allowance will be made connecting lines switching or other terminal service. Route: P. C. & Y. Ry. direct.

43926. To establish on **crushed stone** and **stone screenings,** in bulk, in open top cars, C. L., from Spencer, Ind., to Linton, Ind., 60c per 100 lb. Route: Via P. R. R. direct. Distance, 38 miles.

43942. To establish on **sand,** except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica, and **gravel,** C. L., in open top cars, from Kenneth, Ind., to Lucerne, Ind., 40c; Grass Creek, Ind., 45c per 100 lb. Route: P. R. R. direct.

43945. To establish on **limestone,** unburnt, ground or pulverized, C. L., minimum weight 60,000 lb., from Ridgeville, Ind., to Mendon, Wasepi, Kalamazoo, Mich., (1) $1.50; Pontiac, Mich., (2) $1.75; Burr Oak, Mich., (3) $1.50, and Leonidas, Mich., (4) $1.65.

(1) P. R. R. direct.
(2) P. R. R., Toledo, Detroit, G. T.
(3) P. R. R., Sturgis, N. Y. C.
(4) P. R. R., Kalamazoo, Mich., M. C. R.R.

43946. To establish on **limestone,** unburnt, ground or pulverized, in box cars, in bulk or in packages, C. L., minimum weight 50,000 lb., from Rockford, O., to various destinations in Ohio, Indiana and Kentucky, as shown: To Alexandria, Ind., $1.50; Evansville, Ind., $2.30; Ft. Wayne, Ind., $1.40; Hammond, Ind., $2.10; Hartford City, Ind., $1.30; Hillsborough, Ind., $2; Indianapolis, Ind., $1.90; Hobart, Ind., $2; Dunkirk, Ind., $1.30; Elwood, Ind., $1.70; Gas City, Ind., $1.40; Jeffersonville, Ind., $1.70; Kokomo, Ind., $1.80; Lapel, Ind., $1.70; Muncie, Ind., $1.40; Louisville, Ky., $2.40; Decatur, Ind., $1; Canton, O., $1.50; Cincinnati, O., $1.40; Cleveland, O., $1.50; Columbus, O., $1.40; Dayton, O., $1.20; Geneva, O., $1.80; Newark, O., $1.40; Bellaire, O., $1.80; Cambridge, O., $1.50; Mt. Vernon, O., $1.40; Toledo, O., $1.30; Zanesville, O., $1.50; Tiffin, O., $1.30; Niles, O., $1.80; Silica, O., *$1.30. *Toledo, O., rate plus switching rate.

43947. To establish on **crushed stone** and **crushed stone screenings,** in bulk, in straight or mixed carloads, in open top cars, from Marion, O., to Agosta, LaRue, O., 40c; Ridgeway, O., 50c; Big Springs, Rushsylvania, Harper and Bellefontaine, O., 60c per 100 lb.

Southern

9024. Proposed rates on **stone, broken,** C. L., in open top cars, (See Note 3), from Balsam, N. C.: To Buffalo, N. Y., 26; Youngstown, Warren, Cleveland, Ohio, 23; Canton and Massillon, O., 22c per 100 lb.

9084. (Sou. Ry.) It is proposed to establish a charge of 350c per car for switching **slag** from plant of the Swann Chemical Co. to plant of the Woodstock Slag Corp. at Anniston, Ala.

9093. **Phosphate rock,** C. L., Florida origins to Anderson, Greenville, Spartanburg, Blackburg, Lancaster, and Hartsville, S. C. It is proposed to establish reduced rate of 462c per ton of 2240 lb. on phosphate rock (other than ground phosphate rock, slush and floats [refuse and washings from phosphate rocks] and soft phosphate), subject to present description and carload minimum weight from Florida origins shown in A. C. L. R. R. Phosphate Rock Tariff 7, I. C. C. B-2750, and S. A. L. Ry. Phosphate Rock Tariff 9, I. C. C. A.-7658, to above named destinations.

Amdt. 1 to 9093. To suggest rate of 462c per ton 2240 lb. on ground **phosphate rock,** C. L., as described in Item 235 of A. C. L. R. R. Phosphate Rock Tariff No. 7, I. C. C. B-2750, and similar item in S. A. L. Ry. Phosphate Rock Tariff No. 9, I. C. C. A-7658, from Florida origins shown in the above tariffs to Anderson, Greenville, Spartanburg, Blacksburg, Lancaster and Hartsville, S. C.

9103. **Stone,** rough, dressed, carved or polished, C. L., to amend S. F. T. B. Tariff 285, I. C. C. 1929, to provide for rates as per Descriptions 1, 2, 3 and 4 of the tariff, to Georgetown (West Washington, on B. & O. R. R.), D. C., made same as rates to Washington, D. C., from Tate, Ball Ground, Jasper, Nelson and Talking Rock, Ga.

9118. **Sand, molding,** C. L., Camden, Lipe, Sawyers Mill and Hollow Rock, Tenn., to points in I. F. A. territory. To establish through rates, (See Note 3), from above named origins to various points in the states of Illinois, Indiana, Iowa, Missouri and Wisconsin, same to apply in lieu of present combinations. Proposed rates to representative points are as follows: To Alton, Ill., 210; Aurora, Chicago, Ill., Gary, Ind., Burlington, Ia., 280; Bloomington, Ill., Louisiana, Mo., 240; Decatur, Ill., 230; Freeport, Ill., 290; Jacksonville, Ill., 230; Peoria, Ill., 250; Quincy, Ill., 260; Milwaukee and Racine, Wis., 310c per net ton.

9130. **Sand (moulding),** C. L., Camden, Lipe, Sawyers Mill, and Hollow Rock, Tenn., to points in C. F. A. territory. To establish through commodity rates, (See Note 3), from above named points to various points in the states of Indiana, Michigan and Ohio. Proposed rates, in cents per net ton to representative points are as follows: Akron, Ft. Wayne, Ind., 290; Brazil, Terre Haute, Ind., 230; Connersville, Ind., 260; Lawrenceburg, Ind., 250; Muncie, Richmond, Ind., 270; Ann Arbor, Detroit, Mich., Akron, Cleveland, O., 330; Benton Harbor, Mich., 300; Flint, Mich., 340; Columbus, O., 290; Springfield, O., 280.

9144. To establish rate of 390c per net ton on **limestone** and **marble, ground or pulverized** to fineness to pass through a screen of 200 mesh to the inch, C. L., minimum weight 60,000 lb., from Tate and Whitestone, Ga., to St. Louis, Mo., and East St. Louis, Ill. The proposed rate is the same as rate formerly in effect.

9151. **Phosphate rock,** not acidulated (acid phosphate) nor ammoniated, and **limestone,** phosphatic, C. L., N. C. & St. L. Ry. stations: viz., Aetna, Bon Aqua, Centreville, Columbia, Easton, Harsh Switch, Hohenwald, North Riverside, Twomey, and Perryville, Tenn., to Florence and Sheffield, Ala. To revise rates as follows:

(In cents per ton of 2000 lb.)

From	Proposed
Centreville District (Group 1 mines)..	186
Perryville, Tenn. (Group 2 mines)...	216

9163. To establish rate of 220c per net ton on **talc,** crude or lump, C. L., minimum weight 70,000 lb., from Murphy, N. C., to Cleveland, Tenn., same as rate applicable on crude soapstone.

9164. **Feldspar,** C. L., Bryson and Lake Toxaway, N. C., to Brookneal, Va. It is proposed to establish rate of 350c per net ton, minimum weight 50,000 lb., from and to above named points.

9217. To establish rate of 200c per net ton on **feldspar,** C. L., minimum weight 60,000 lb., or (See Note 1) if less than 60,000 lb., from Lake Toxaway, N. C., to Erwin, Tenn., same as rate applicable from Bryson, N. C., to Erwin, Tenn.

9231. To publish transit rate of 10c per gross ton on wet **phosphate rock,** C. L., from Pebbledale, Fla., to Ridgewood, Fla., to be dried and reshipped.

Western

C-11-14. **Cemcrete** (paper sack containing certain percentage of cement and balance sand and gravel) in mixed carloads with cement, minimum weight, 60,000 lb., from La Salle-Oglesby, Ill., and Cape Girardeau, Mo., to points of destination in Central Freight Association, Western Trunk Line, Southwestern and Southeastern territories. Rates: Present—No rating in effect in the Classification governing this article. Proposed—To apply cement rates on these packages of cemcrete in mixed carloads with cement.

D-41-83. **Stone,** crushed, ground or pulverized, C. L. (See Note 2), but not less than 40,000 lb., from Columbia, Mo., to Colorado common points. Proposed, 21c per 100 lb.

D-41-93. **Stone,** crushed, C. L., (See Note 3), but not less than 40,000 lb., from Pinehill, Mich., to Chicago, Ill. Proposed—11c per 100 lb.

D-41-94. **Stone,** breakwater, C. L., (See Note 3), but not less than 50,000 lb., from Bedford, Ind., district to Kewaunee, Wis. Proposed—250c per net ton.

D-41-96. **Limestone,** crushed or ground, C. L. (See Note 3), but not less than 54,000 lb., from Omaha, Neb., to Independence, Mo. Proposed—180c per net ton.

D-41-99. **Sand,** coated with not to exceed 10% asphalt (See Note 3), but in no case less than 40,000 lb., from Pacific, Mo., to Illinois points. Rates in cents per ton of 2,000 lb.

PROPOSED

	Single Line	Joint Line
40 miles and under	143	163
125 miles and over 40 miles	153	173
150 miles and over 125 miles	176	196
175 miles and over 150 miles	188	208
200 miles and over 175 miles	199	219
225 miles and over 200 miles	211	231
250 miles and over 225 miles	222	242
275 miles and over 250 miles	234	254
300 miles and over 275 miles	257	277
325 miles and over 300 miles	268	288

D-41-100. **Sand,** molding, C. L. (See Note 3), from Boulder, Louisville and Lafayette, Colo., to Wichita, Kan. Proposed, 25c per 100 lb. Rate subject to emergency charge.

E-41-95. **Stone,** crushed, (See Note 3), from Weeping Water and Nehawka, Neb., to Council Bluffs, Ia. Proposed, 55c per ton of 2000 lb. Rates to carry expiration date of December 31, 1935, and provision made that no switching is to be absorbed at Council Bluffs, Ia.

Southwestern

6056. To establish rate of 353c per ton of 2000 lb. on **chatt sand,** carloads, from Picher and Miami, Okla., to Heltonville, Ind. Rates the same as are presently established from Webb City, Mo., district to Heltonville, Ind. No change in present routes.

6164. Publish the following provision in connection with rates on cement, hydraulic, natural or portland, from La Salle, Oglesby, Ill., and Marquette, Mo., to all destinations: "Shipments of **cemcrete** (a concrete mixture consisting of cement and sand or of cement, sand and gravel, the amount of cement in the mixture not to exceed, in any case, 25%), in paper sacks in mixed carloads with cement, may be shipped in mixed carloads with hydraulic, natural or portland cement on the following basis: (a) Apply to the actual weight of the cemcrete (concrete mixture) the carload rate on cement. No minimum weight to be observed on cemcrete. (b) Apply to the actual weight of the cement (other than that in the mixture) the carload rate on cement, observing the minimum weight on cement, currently published in the various cement tariffs."

Illinois

7374. **Cemcrete** (paper sack containing certain percentage of cement and balance sand and gravel), in mixed carloads with cement, C. L., minimum 60,000 lb., from La Salle-Oglesby, Ill., to destinations in Southern Freight Association territory. Present—No rating in effect. Proposed—Apply cement rates on these packages of concrete in mixed carloads with cement.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

Modern Lime Plant

Started in 1925—Completed in 1935

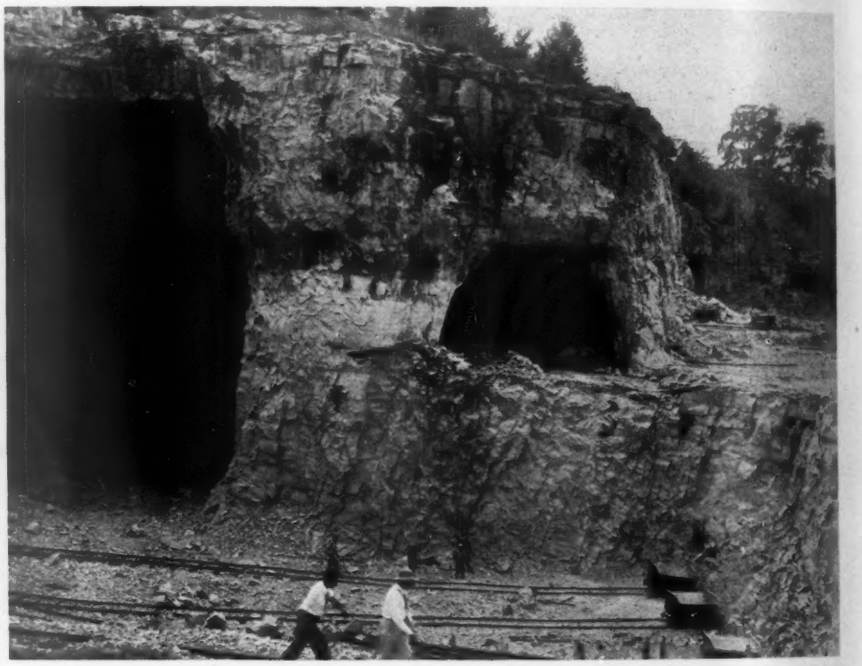
ONE of the most progressive concerns is the Hunkins-Willis Lime and Cement Co., St. Louis, Mo., and at its lime plant, Peerless White Lime Co., St. Genevieve, most of the outstanding developments that took place in the district were initiated. It was first with gas producers, first with induced draft, first with deep cooler, first with high kilns, first in applying science to lime burning.

But this company, as well as all others, had great difficulties during the recent depression, and forced by the economic situation, many a development had to be broken off before it reached the final stage. Some of the more outstanding efforts, like the large kilns or the new modern boiler, loomed out of the gloomy light of economic depression as glaring mistakes—as so much money thrown away.

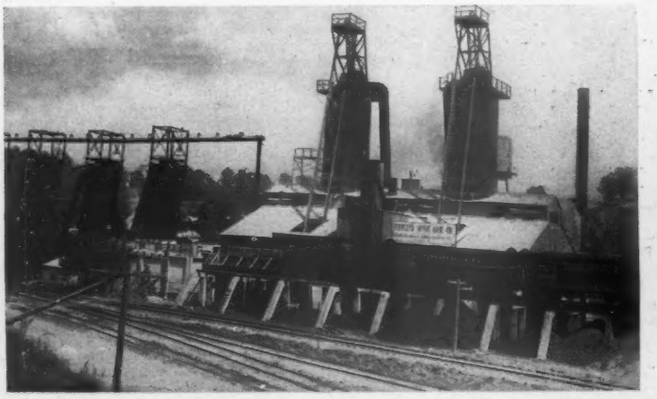
It should be, and no doubt is, of great satisfaction to Gordon Willis who captained the concern through the storm, and to the progressive spirited D. S. Hunkins, that now these apparent mistakes turn into valuable assets; in fact, the putting in service very recently of the No. 10 kiln would have been a quite proper occasion for a celebration on the part of the industry as a whole.

The lime plant of this concern never was as out-of-date as some still are today, but even then, ten years ago, it was decided to build a really modern extension. The step for those days was daring but very carefully thought out. Two large kilns were built, No. 9 and No. 10, but only the first completed. An R. D. Wood gas producer was installed and everything was laid out on a grand scale. To the top of the skip structure, the kilns certainly were the tallest in the world, and the height from the floor to the burners was as great as the total height of many kilns in operation today. Shell diameter was 16 ft., shaft dimensions 6 ft. by 12 ft.

The first No. 9 kiln was put in operation and its performance continued to improve,



Above: Tunnels and quarry of Peerless White Lime Co. plant. Below: Views of new kilns, with old kilns in background



and when all was right the second was to be completed. But when that time was reached, the entirely unforeseen depression settled upon everything, and even the No. 9 kiln had to be shut down. When everything was at the worst, out of the long string only two old kilns were operating, and frequently even they had to be hand-fired. And the new kilns stood there, to the unknowing and unthinking every bit like monuments of folly. And through the industry there was mumbling about the recklessness of expenditures, and even about failure of equipment. And many assumed a superior, sanctimonious attitude upon no other basis than that they were wiser by having done nothing.

One indeed had to feel sorrow for the president, Willis, who ever was the torch bearer, and who, towards the end of a long life saw things crumble all around him and his dreams come to naught, with this new plant addition lying there utterly useless and to all appearances, a white elephant.

But time goes on and today this plant is producing under full blast. No. 9 kiln itself, during July put out 1775 tons of lime. The fuel ratio for this and other kilns connected to the producer was 4.2 tons of lime per ton of Illinois coal screenings, which does not happen to be such particularly good fuel either. Those who were "wiser" are still limping along with a ratio of maybe 2½ to 1, or even less; although you could not get them to admit it.

For the sake of Gordon Willis, who certainly did not deserve what the depression brought him, and for the sake of the industry, it certainly is most pleasing that matters have righted themselves so this dream of ten years ago is fully realized and is bearing fruit today. If this would not have been the case, the "wiser" would have been right and progress would not have paid. And the world would have come to standing still forever!

Lime

National Mortar and Supply Co., Gibsonburg, Ohio, has begun reconstruction of its storage and shipping facilities—a rehabilitation program said to call for an expenditure of $150,000.

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Ash Grove Lime and Portland Cement Co., Kansas City, Mo., is building a new machine shop at its Galloway, Mo., lime plant, to cost with equipment about $25,000.

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Statistics: Trade Relations Committee of the National Lime Association reports statistics for March, April and May, 1935, as follows:

	Total capacity represented, short tons	Total shipments reported, short tons	Average value per ton
March, 1935....	401,439	166.350	$7.51
April, 1935.....	394,765	176,983	7.75
May, 1935.....	275,501	115,446	8.02

TOTAL SHIPMENTS AND CAPACITY*

	Ratio Shipments to Capacity, Per Cent										
					Lime Manufacturing Districts						
United States	1	2	3	4	5B	6–8–9	7	10–11	12	13	14	15
41.4	21.7	52.6	53.9	47.9	40.8	24.9	50.7	46.4	27.3	16.3	39.5	24.5
44.8	31.2	62.4	68.0	50.1	42.6	33.7	43.5	44.1	36.5	20.7	37.0	18.4
42.0	30.5	69.4	60.2	57.0	34.0	27.9	41.4	38.5	25.3	28.2	35.9	24.7

*All data relate only to competitive lime. Total capacity under Table 1 includes the following capacity reported as idle: March, 8644 tons; April, 11,817 tons; May, 9740 tons.

Kennedy Co., Bettsville, Ohio, manufacturer of hard-burned dolomite, is reported to have resumed operation in August.

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Cement

Alpha Portland Cement Co., Catskill, N. Y., went into production August 15, after a shutdown of about six weeks.

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St. Louis, Mo.: Board of Public Service rejected a suggested amendment to a pending city ordinance, which would have required all cement used in the city for private as well as public work to be submitted to the municipal testing laboratory for inspection. The bill, which was drafted and sponsored by the Board of Public Service, now provides inspection by the laboratory of all cement used on municipal work and sets a fee of 5c a barrel to pay costs. The amendment would not only include cement used in private work, but would require a fee of 10c a barrel for cement contained in sacks and 5c for bulk cement, which must be shipped in water-tight steel cement cars.

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Lehigh Portland Cement Co., Metaline, Wash., was expected to place its second 1000-bbl. per day kiln in operation about August 15—first time in years the plant is to be operated at full capacity. The prospect of supplying a part of the cement for the Coulee dam is one of the factors behind the enlarged operations. Roy N. Young, chemical engineer, and William Harbaugh, plant engineer, of the home office, Allentown, Penn., were recently at Metaline initiating the manufacture of high early strength cement.

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Imports: New York City newspapers have published considerable about increasing imports of European portland cement. The *Wall Street Journal* said recently: "Increasing imports of foreign portland cement are becoming a growing menace to the markets and the price structure of the domestic industry along the Atlantic and Gulf coasts. Despite a steady decline in domestic sales since the first of the year, every month, with the exception of April, has seen overseas shipments here far ahead of a year ago. May imports into the United States and its territories of 85,521 bbl. were up 293% and brought the total for the first five months of the year to 174,781 bbl., an increase of 144%. The acceleration of the rate of imports is attributed to the reciprocal trade pact made with Belgium several months ago—whereby the tariff on cement from that country was reduced by 25%—and the devaluation of the belga by 28%. Under the trade agreement, the tariff becomes 4½c a 100 lb., or 17 1/5c per bbl. Although the bulk of the foreign product is aimed at the normally big consumption areas within trucking distance of New York and Boston, moderate quantities are appearing in San Antonio, New Orleans and other Gulf coast centers as well as in Puerto Rico. Belgium and Denmark are contributing the major part of the imports. Reports in the trade are that a shipload of Russian cement is now on its way to this country—the first from that country in a considerable time. Japan is active in the Hawaiian markets."

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North American Cement Corp., Catskill, N. Y., ceased production on August 6 for a period of about six weeks, with stock bins practically full. According to the local press, G. A. Witte, superintendent, issued an explanatory statement, in part as follows: "We had rather confidently expected considerable activity during the second half of this year based on the $4,000,000,000 Federal Work Relief program and the expectation that New York State would receive from these funds a considerable sum of money for road construction, and we had based our production schedules on that assumption. It now develops that the long delay in working out the details for the expenditure of these funds and the arbitrary rules which have been set up restricting their application in road building will result in delaying the benefit to our business until next year. The diversion of gasoline taxes in New York State from their normal use in maintenance and construction of roads is also an immediate factor in restricting our volume of business. Our company has experienced a very satisfactory increase in business for all sorts of small uses, including residential construction, but the larger class of privately financed construction is being held back by lack of confidence, and for the reasons just stated there has been a very drastic falling off in the use of cement in public works during the current year. Two things are necessary before our Catskill plant will be able to operate fully and give normal employment to its nearly 300 employes. The first is a return of confidence so that capital will again be freely invested in all sorts of construction, and second, is the use of gasoline taxes for their proper purpose resulting in a normal volume of high class road construction. While we have been disappointed in 1935, we still hope that progress will be made along those lines and that 1936 will show some improvement."

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Colorado Portland Cement Co., Boettcher, Colo., ceased production August 8 with its silos filled. Shipments from stock will be made for an indefinite period.

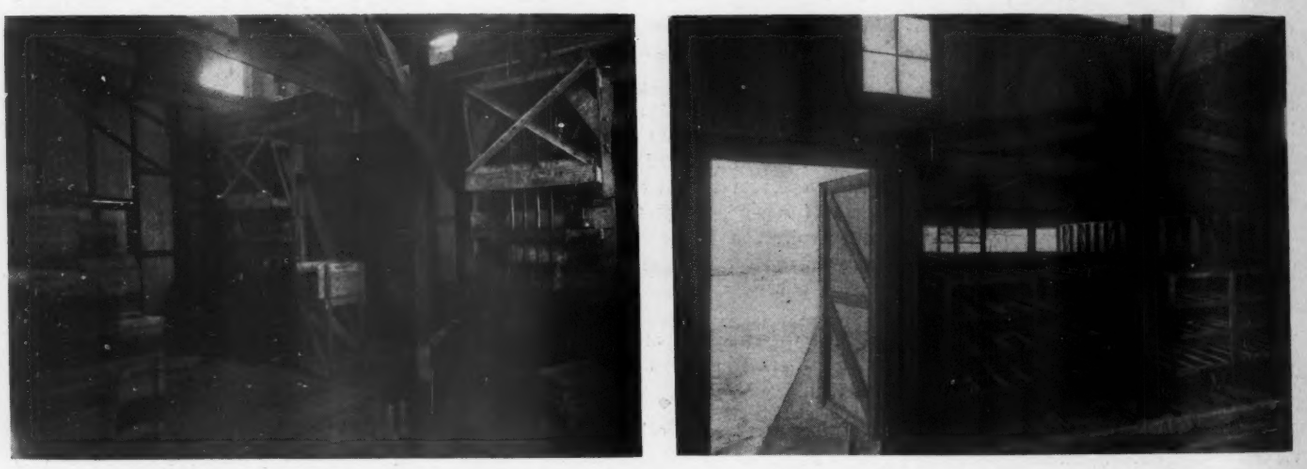
Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Block Plant Takes Advantage of Quarry Site

THE LEXINGTON CONCRETE PRODUCTS CO., Lexington, Ky., sold its concrete pipe plant recently to the Kentucky Concrete Pipe Co., Frankfort, Ky., and moved its block and tile plant equipment to the site of the quarry and plant of the Central Rock Co., west Lexington. Here the equipment was used to manufacture the materials for the new buildings. The new plant began commercial operations about July 1.

The new plant is located at the edge of the quarry, which is partly filled with water, thus providing an adequate water supply and a source of sand and crushed stone aggregate from storage piles close at hand. The main building is 40 by 30 ft. and the curing room 24 by 45 ft.



Above—left: View of two block-making machines of Lexington Concrete Products Co. Right: View of trays and curing room

Above—General view of Lexington Concrete Products Co. on edge of quarry lake. Pipe line leads from lake to small tank. Aggregate is brought in on left side, and block are finished on right side

The operation is designed to use gravity so far as possible, the materials being delivered to elevated bins and working down. Aggregate is brought in at the west end of the plant, and feeds by gravity to a mixer. The mixer discharges by gravity to the block machines. Ground level under the elevated parts of the plant was built up by use of the stripping from the quarry.

A 2-sack Ideal mixer is used. A very dry mix of 1 part cement to 4 parts medium sand to 4 parts gravel (½-in. down) by volume is used. Two Anchor power strippers are used to make the tile and blocks, wooden forms being used for blocks and steel for the tile; 4x5x12-in. and 8x5x12-in. load-bearing tile are made, and 8x8x16-in. and 8x12x16-in. building block. Both plain (or stripper) block and face block will be made.

The curing room is equipped with six racks. Each rack consists of 5 cars on a 27-in. gauge track, giving 30 cars with racks in all. Likewise a 27-in. gauge track goes midway between the Anchor power strippers. The gap from this track to the others in the curing room is bridged by a connecting section traveling on rails in a right-angle direction.

The block and tile are allowed to remain on the racks for 24 hours before being moved to stock just outside of the plant by means of another right-angle track. If it is exceptionally hot, they are sprayed while in the curing room and also after leaving the room. Otherwise there is no spraying.

Water is supplied for mixing and for spraying by means of a centrifugal pump, taking water from the quarry. Water is pumped to a 250-gal. steel tank on top of the plant, which supplies the necessary head.

The capacity of the plant is 2500 block or tile per 8-hour day.

Cement Products

Cement Products Co., Henderson, Tex., E. G. Brown, manager, specializes in well curbs, a concrete tile for water wells designed "to protect the fresh, sweet taste of the water, as well as to protect against salamanders, cave-ins and all forms of contamination."

* * * *

Engleman Lumber Co., Louisiana, Mo., has established a concrete building unit manufacturing plant with a capacity of 1000 pieces per day. The hollow tile now being made are 4x6x16 in. and are of vibrated concrete.

* * * *

Oklahoma City, Okla., is planning to build a municipal ready-mixed concrete plant.

* * * *

Atlantic City, N. J., it is reported, may build its new water main across the salt marshes of concrete pipe instead of cast-iron, because WPA labor can be used to make it; the city is having difficulty getting federal money to buy cast-iron pipe.

Central Pre-Mix Concrete Co., Inc., Spokane, Wash., has done 50% more business in the first seven months of this year than in any previous year, according to a local newspaper, which continues:

"'We attribute the progress made by our company to the co-operation given us by the architects, engineers and contractors through their insistence for better quality concrete and the fact that the public is becoming educated as to what to expect when ordering concrete,' William Murphy, president of the company said. 'The Pre-Mix company has supplied small home owners as well as contractors in the past year, as the residents are realizing the savings possible on small orders. Making concrete is very much the same job as that of a housewife making cake; if all of the ingredients are not proportioned and mixed the result will be a failure. The rigid tests to which materials are subjected, coupled with the years of experience of our staff, have enabled us to turn out a quality of concrete that is gaining us new friends and customers not only among the larger users of concrete, but also among the small home owners.'" Herbert D. Sullivan is the manager of the plant.

* * * *

Universal Concrete Pipe Corp. formally opened a new plant in Syracuse, N. Y., on August 3. B. H. Palmer, Rochester, is district manager.

* * * *

Camp Concrete Products Co., Columbus, Ga., is constructing a new plant to manufacture products, including pipe. The company will move from its present location on leased land, near the plant of the Georgia Gravel Company. Its city office and yard will remain at the same location, on Hamilton avenue. The manufacturing building will be 60x80 ft., and will be one and two stories. Foundations will be of concrete, and walls of concrete blocks. In the center it will be two stories, with reinforced concrete columns and beams. The roof will be of concrete. It is planned to have an absolutely fireproof building. There will be four curing sheds, each 100x200 ft. Sides will be of concrete blocks, and the buildings will be roofed with concrete. In the summer the concrete pipe will be sprayed and in the winter will be cured by steam. The sheds will be sealed, so that the steam treatment can be effective. The company manufactures concrete pipe in sizes ranging from 6 in. to 48 in. in diameter. It has been making pipe since 1924. A concrete block machine will be installed in the plant for service when required. Some months ago the company installed its own barge and pumping outfit on Bull creek and has been securing sand and gravel from this source. The new plant will be somewhat nearer the scene of the sand and gravel operations than the present one.

L. S. Mitchell, Walterboro, S. C., has established a plant to make concrete building units, as well as garden furniture.

* * * *

Concrete Products Co., Charleston, S. C., has added to its plant equipment for making cinder concrete building units. Building tiles, drainage tiles, fence posts, roofing tiles, garden furniture and ornamental pieces are some of the other products manufactured by the firm. Its selling territory covers an area approximately 50 miles in radius. Geo. P. de Saussure is general manager. Products are shipped out by railroad and by motor truck. The sand is brought from Pon Pon, the cement from Clinchfield, Ga., and the gravel from Wateree. The firm does a gross output business of from $20,000 to $25,000 a year, according to officials. One of the specialties of the company is manufacturing imitations of old stones and woods. Experiments were conducted and a formula was developed to turn out concrete flagstones which look almost exactly like real Charleston flags. Another formula was developed to make cement shingles which look very much like genuine cypress. Since its establishment six years ago, the concern gradually has expanded until it now handles a complete line of building materials, including cement, lime, sand, gravel and other materials.

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Slag

Woodstock Slag Co., Birmingham, Ala., broke ground early in May for a new screening plant at Anniston, Ala. Slag, crushed to 1½ in. size is to be puchased from the Swann Chemical Co. Besides sizing the slag for commercial uses, it will be washed. A Robins double-deck vibrating screen will be used for preliminary screening and washing, and a Nordberg double-deck Symons vibrating screen for further sizing. The finished material will be stored in a circular area of ground divided into six angular compartments according to the patented system of George Kern (Milwaukee, Wis.). Recovery is by a crane and drag scraper.

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Crushed Stone

Linwood Cement Co., Davenport, Ia., crushed stone producer, now in receivership: court has approved expenditure of $3000 for development of quarry.

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Dan Mumbrue, Helena, Mont., has offered the state land board a royalty of 3½c per ton (7.7c per cu. yd.) for rock near Big Sandy, Mont., should he get a contract to supply rip rap for the Fort Peck dam. About 1,000,000 cu. yd. will be required.

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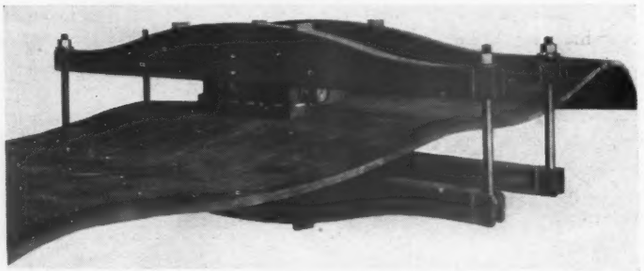
Guy R. Schultz, Paulding, Ohio, and J. S. Blosser, Blosser Stone Co., have opened a new quarry and crushing plant near Grover Hill, Paulding county. The capacity is 200 tons per day.

How to Vulcanize Damaged Conveyor Belts

By Paul Wm. Van Orden*

SINCE the publication of the article, "Prolonging Conveyor Belt Life" (March issue of ROCK PRODUCTS), a number of readers have asked for more details on several points relating to their specific operating problems. The previous article presented a brief history and description of conveyor construction and illustrated the making of a major conveyor belt repair up to the point of vulcanization. There appears to be considerable confusion regarding the technique of vulcanization and it is hoped that this additional information will prove helpful to many users of conveyor belting.



Left—Fig. 1. Vulcanizing press of single platen type

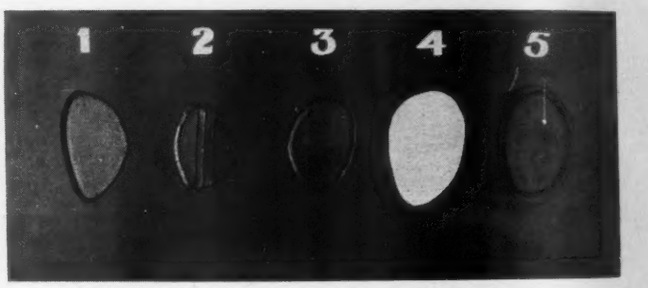
The application of heat to the rebuilt portion of the belt must be accompanied by pressure. Consequently, the portable vulcanizing press is bulkier in appearance than might seem necessary otherwise. The press is built of special alloys to cut down weight, yet it must exert a pressure of about 100 lb. per sq. in. without harmful deflection. Automatically controlled temperature of 287 deg. F. is maintained.

The accompanying illustration shows the accepted size and type of press for doing this kind of work—having a heated platen area of 12 in. x 15 in. (Fig. 1). You will notice that there is but one heated surface and a dummy platen is placed on the back of the belt to supply the necessary pressure. Clamping bars are designed to permit the press to be used on any part of the belt surface.

One large conveyor user has raised a very pertinent point that probably has perplexed other users. He writes: "That's all very interesting, but I rarely have a belt as bad as the one you describe. When I do, I cut the belt and relace it. What I want is something small and light that can be used to take care of cover gouges!"

Fortunately, there is an answer to complaints such as this. Fig. 2 shows an ideal set-up for doing this work. It does not cost over $60 and has the advantage of being light and quick to handle and adjust. Furthermore, it runs on power from any light socket, drawing no more "juice" than an ordinary electric iron. You will notice that, like the device in Fig. 1, it has but one heated platen (6 in. x 12 in.) and the pressure is applied by 4-in. x 4-in. timbers acting on the press and a 9-in. x 15-in. piece of boiler plate under the belt.

Fig. 3 shows the various steps of repair. The only requisites other than the equipment shown in Fig. 2 are: a supply of unvulcanized cover stock and proper cements. After a bit of practice anyone can do this work very quickly repairing one gouge while another is vulcanizing. In fact, two men have been known to keep three presses busy at one time.



Right—Fig. 3. Various steps of repair

Vulcanized Step Splices

So much for repairing. At the end of the previous article the subject of eliminat-

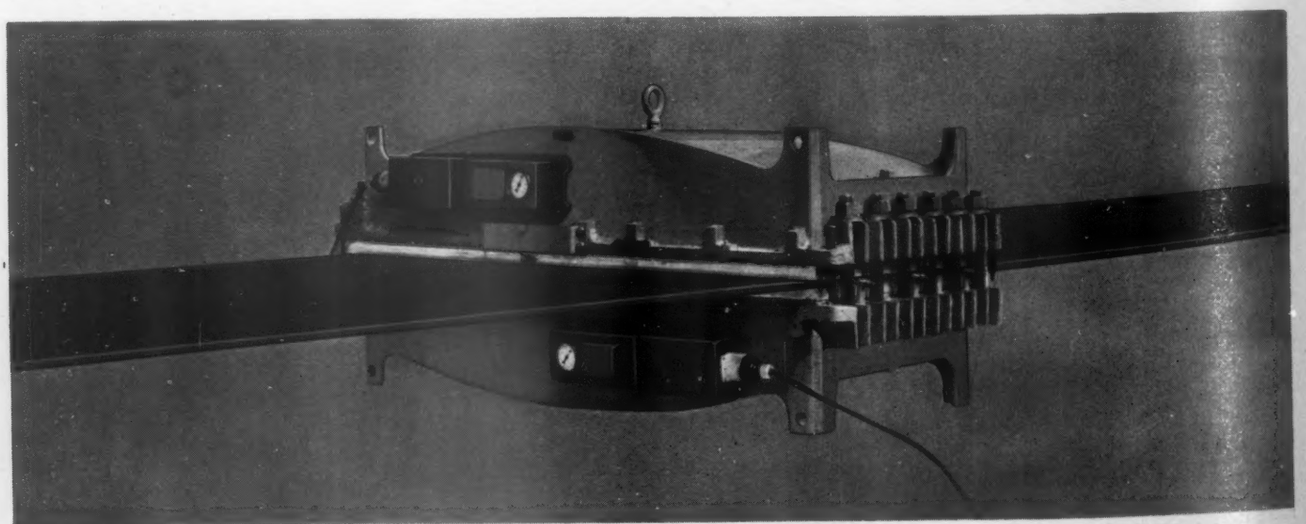
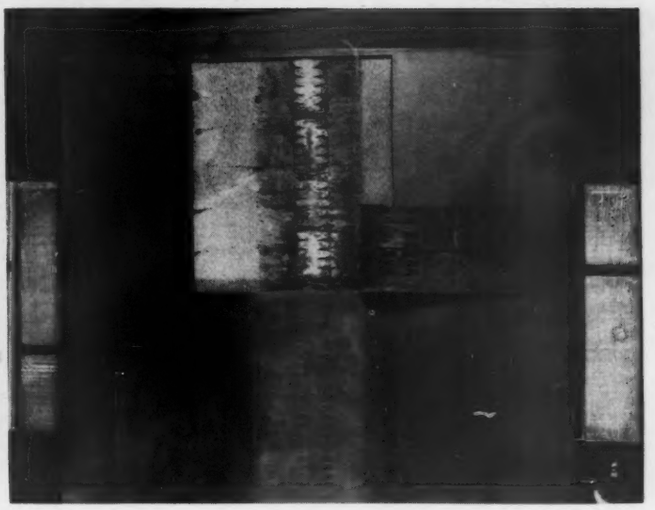


Fig. 4. Vulcanizing press of double platen type

*Manager, Belting Sales, The B. F. Goodrich Co., Akron, Ohio.



Left—Fig. 2. A complete set-up for vulcanizing. Right—Fig. 5. Both metal fasteners and field splicing used in this repair job

ing metal fasteners by the use of a vulcanized step splice was mentioned. The advantages or disadvantages of metal lacings are rather obvious. They have their place in the scheme of things but who doesn't want his belts endless if economically possible to have them so? Endless belts are a little higher in first cost, but when well-made should last a number of years, during which time metal lacings would have to be renewed many times. Two instances of this come to mind. First, the experience of one coal company which operates several miles of belting and must keep an eagle eye on costs. Its savings from making its belts endless run into the tens of thousands of dollars. In another instance, two splices were made in a long conveyor belt during the spring of 1927. The belt is still in service. Of course it pays!

Here's the procedure. The belt is first run on the job for a month or so with metal fasteners until it is trained and has the initial stretch taken out and acclimated itself to the atmospheric conditions under which it is required to work. It is then pulled up with the belt clamps until taut and the take-up in its minimum position.

The operations in making a step splice in a conveyor belt may be classified under four headings: (1) Cutting away and stepping down the plies of fabric and cover stock, one at a time on one end of the belt. On the opposite surface of the other end of the belt the same operations are performed. (2) Cementing the stepped ends and applying tie gum. (3) Fitting stepped ends together. (4) Vulcanization.

To perform this work, a flat surface at least 20 ft. long and 4 ft. wider than the belt should be available. Tools and equipment are simple indeed. Detailed instructions for making conveyor belts endless can be obtained from the manufacturer of the belt.

Presses of the double platen variety may be obtained for belts up to 60 in. in width. (See Fig. 4.) However, if your conveyor operations are not extensive enough to justify the expenditure for this splicing equipment, the larger rubber companies have equipment and trained men to do this work at a reasonable cost.

Both Metal Fasteners and Slicing

The use of metal fasteners and field splicing implanted in one man's mind the idea that the three could be combined so that at a minimum of cost he could have, in part at least, the physical and economic advantages of both, through metal fasteners and the field splice (Fig. 5). This job was done with the outfit shown in Fig. 2. The belt was pulled up and cut square and the cover removed, top and bottom, back for about 2½ in. (The edge was not removed.) The proper type of metal fasteners for the remaining carcass thickness were then installed and the cover built back in with unvulcanized cover stock. It was then vulcanized in stages, both top and bottom, with the small repair press before the clamps were removed and tension put on the belt.

The result was an inexpensive splice with the metal fasteners protected from wear and the belt ends from moisture. In operation it won't pound the idlers, get caught or tear out as readily as when unprotected. It must be watched, though, because it will eventually pull out like any other metal lacing, but experience will tell you about when it will be ready for replacement. However, it is highly satisfactory and worthy of consideration on any installation.

Portland Cement Pavement

AWARDS of concrete pavement for July, 1935, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded during July, 1935	Total Sq. yd. for year to date, Aug. 3, 1935
Roads	2,380,846	11,842,959
Streets	904,039	5,609,376
Alleys	18,032	77,942
	3,302,917	17,530,277

San Francisco Bridge Materials Suit Dropped

PATENT SUITS brought by American Aggregate Co., Kansas City, Mo., and McNear Co. of San Rafael, Calif., against Gravelite, Inc., California Toll Bridge Authority and certain contractors engaged in construction of the San Francisco-Oakland Bay Bridge, have been voluntarily dropped.

The action was commenced in federal district court in San Francisco last March, it being alleged that the use by the defendants of a light weight aggregate material called "Gravelite" in construction of the floors of the Bay Bridge infringed a patent owned by American Aggregate Co. covering a building material called "Haydite."

The allegations of infringement were denied by all of the defendants.

Sand-Lime Brick Production and Shipments in July, 1935

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada.

Eleven sand-lime brick plants reported for the month of July, this number being three more than the number reporting for the month of June, statistics for which were published in August.

Average Prices for July

	Plant price	Delivered
Pontiac, Mich.	....	$12.00
Dayton, Ohio	$13.00	14.75
Grand Rapids, Mich.	....	12.50
Detroit, Mich.	....	11.50
Mishawaka, Ind.	9.25	....
Syracuse, N. Y.	14.00	16.00–20.00
Saginaw, Mich.	11.00	....
Sioux Falls, S. D.	12.00	....
Toronto, Ont., Can.	12.00	13.50

Statistics for June and July

	June†	July*
Production	1,582,300	2,077,115
Shipments (rail)	206,000	213,450
Shipments (truck)	793,095	1,900,698
Stocks on hand	1,859,799	1,876,806
Unfilled orders	600,000	1,150,000

†Eight plants reporting; incomplete, three not reporting unfilled orders.

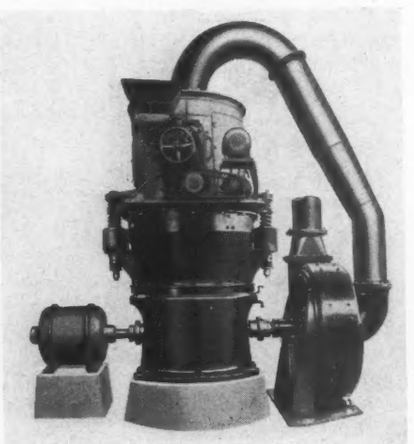
*Eleven plants reporting; incomplete, four not reporting unfilled orders.

New Machinery and Equipment

"Bowl" Mill

RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill., announces a Raymond "Bowl" mill, which is claimed to be a radical departure from conventional types. It is designed to make for low friction losses, hence low power consumption, quiet running and low maintenance, because of no metal-to-metal contact between the bowl and the rolls. The speed is constant with the output controlled by varying rate of feed. Mill power is said to be almost directly proportional to the load. The mill is adapted both to direct firing and to storage systems in coal grinding operations, as well as for pulverizing other non-metallic minerals and various manufactured products.

The unique feature of the mill is a revolving bowl, or grinding chamber. Due to centrifugal force, the coal which is ground between the reduction rolls and the grinding ring works its way up the inclined walls of the bowl. As the ground particles reach the rim, the fines and intermediate sizes are picked up by the air current coming up from the annular spaces around the bowl and are carried into the separator above for further classification. As the finished material is separated out, the oversize drops back and re-enters the mill with the raw feed.



Mill for low friction losses

The rolls are held in a fixed position by heavy journal heads, supported on trunnions that rest on the top plate of the mill. Clearance between the rolls and the revolving bowl may be adjusted from the outside while the mill is running. The journal heads are connected through arms to roll pressure springs and adjustment rods, mounted in cast-iron lugs outside the mill casing. By adjusting these compression springs, the grinding pressure can be controlled to suit the requirements of the coal while the mill is running.

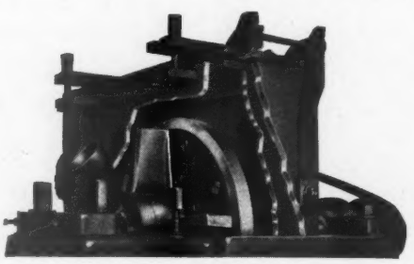
The bowl revolves on a vertical shaft, mounted on roller bearings, and is driven through a worm gear by a horizontal main shaft, direct-connected to a constant-speed standard motor. The vertical shaft and bearings are outside the grinding compartment, and are lubricated by continuous circulation of oil.

The mill parts are claimed to be protected from damage resulting from tramp iron or other ungrindable material by a positive means of disposal; the pressure springs allow pieces of iron to pass the rolls without injury, and when the tramp iron reaches the top of the bowl, it is thrown into the annular space below and expelled by revolving plows through a discharge.

For coal grinding and firing, the Bowl mill is equipped with an air separator and automatic feeder, both mounted on the top plate. The exhaust fan is driven from an extension of the horizontal main shaft, so that one motor drives the fan and the mill. Hot air may be passed into the grinding chamber when necessary for drying the coal.

Sand Blaster

PANGBORN CORP., Hagerstown, Md., announces a new blast cleaning machine adaptable to all types of work that entirely eliminates the need for compressed air as the abrasive driving agent. Instead, a rapidly spinning wheel securely journaled in extra large ball bearings, propels the abrasive by controlled centrifugal force. It is this feature that gives the new unit its name of "Rotoblast."



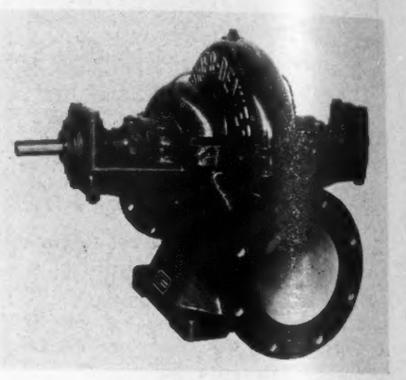
Blast cleaning machine

It is intended, primarily, for cleaning foundry castings, but there are many applications of sand blasting, some of them in and around rock products plants.

Double-Suction Pumps

GARDNER-DENVER CO., Quincy, Ill., has introduced a new line of double suction, single-stage split case centrifugal pumps which, the makers state, combine a number of unusual features. This new line is adaptable to practically any class of service. The pumps are designed for any type of drive, including flat belt, V-belt, direct connected, gas or Diesel engine, although the usual drive is connected directly to an electric motor.

All pumps in the D, E, F and G series are identical in construction, the only difference in pumps being in dimensions. This series of pumps covers all heads up to approximately 300 ft., each type of pump covering a certain percentage of head and thus enabling the buyer to select the exact type of pump for any head up to 300 ft.



Adaptable pump

Heat Recorder

High temperature is the certain signal for trouble in motors and bearings—and, to spot such trouble in the rock products plant, Ideal Commutator Dresser Co., Sycamore, Ill., is offering a temperature indicating device called "Tel-Temp."

Temperature indicator

For large-scale operations, built-in recording devices are usual, but for the smaller plant set-ups and for individual motor or shafting units in large plants, the new apparatus is adaptable. The thermometer is threaded for attachment to a small, cap-screwed base unit. A dozen of the latter may be permanently fixed in trouble zones and then served by a single thermometer unit applied to one and then another.

Lightweight Shovel Dippers

AMERICAN MANGANESE STEEL CO., Chicago Heights, Ill., is producing power-shovel dippers of unusually light weight by proper designing and the employment of aluminum alloy and high-tensile rolled steel for parts not subjected to the heaviest abrasion.

This new type dipper in the larger sizes can weigh less than half of the solid all-cast type, thus allowing a great increase in shovel capacity without a corresponding increase in power used.

Illustrated is a 15-cu. yd. Amsco composite dipper recently shipped to Commercial Fuel Co. for use on a Marion 5320 shovel. It replaces a 12-yd. solid dipper, and the 3 yd. added capacity is completely offset by the lighter proportional weight of the new bucket.

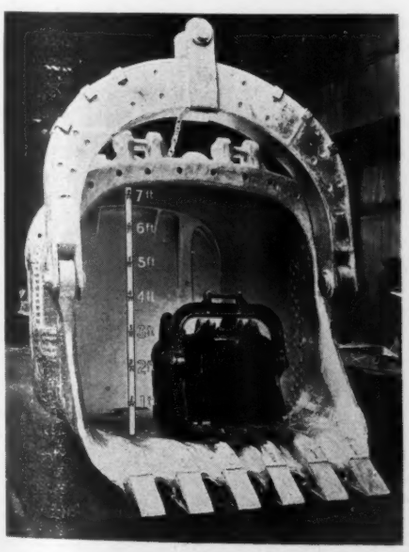
This composite dipper weighs 32,940 lb. as compared with 74,000 lb., the weight of a 15-yd. all-manganese steel dipper made several years ago.

Dippers of this composite design have a top casting of manganese steel, of complete double-wall construction, with integral bases and bail connections. The bottom casting, likewise of manganese steel, is also double-walled at the back where the dipper stick is connected.

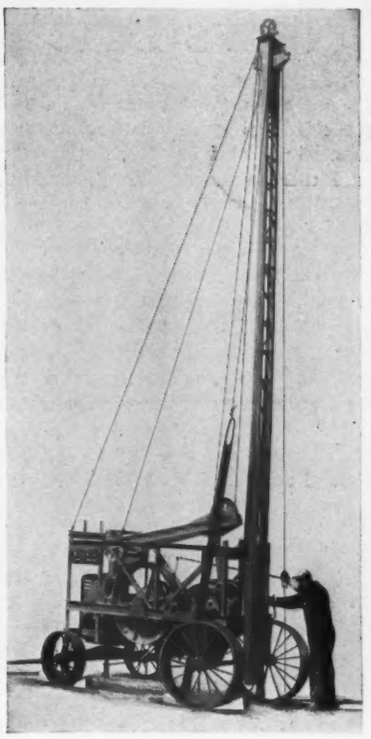
The front plates are high-tensile, rolled steel, welded with spacers to form a double-wall between top and bottom castings. The back plate is of rolled aluminum alloy while the back braces connecting top and bottom castings are cast aluminum alloy.

The door is a one-piece manganese steel casting with integral hinges (U. S. Patent 1,989,818).

It is not pretended that these composite dippers will stand the same abuse that an all-manganese steel dipper of the same capacity can undergo, but for medium work where a plate-or cast-steel dipper affords sufficient structural strength, it is claimed that they are more economical.



Composite, light-weight dipper



A cheaper well drill

A Cheaper Well Drill

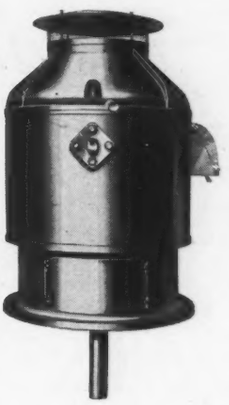
BUCYRUS-ERIE CO., South Milwaukee, Wis., announces a new Bucyrus-Armstrong 21 churn drill, designed for holes up to 300 ft. deep and to 6 in. diameter, and to sell for a materially lower price than the "26" blast-hole drill and the "26P" prospecting drill. The following claims are made for the new drill: sturdy, modern, of welded all-steel construction, capable of handling a thousand pounds of tools; equipped with the exclusive Bucyrus-Armstrong rubber shock absorber—which makes practicable the effective use of wire line; ample power furnished by a heavy duty, 4-cylinder industrial gasoline engine; a one-man drill, easy to set up, and to operate; requires little adjustment and very little maintenance.

The manufacturer describes its field as follows: It is appropriate for use in small quarries and mines, and on construction, coal stripping and prospecting operations. For heavy drilling in large quarries or mines, the crawler-mounted Bucyrus-Armstrong 26 or 29-T electric blast hole drills are recommended, but the considerably lower price of the 21-W makes it a very desirable machine in lighter drilling and where holes of 6 in. or less in diameter give satisfactory results. It will equal the speed of the larger drills mentioned on small hole work. Choice of mounting is available: on a truck; as a two-wheel or four-wheel trailer; or for team or tractor haul.

Vertical Slip-Ring Motor

HARNISCHFEGER CORP., Milwaukee, Wis., has developed a new series of vertical slip-ring motors which depart from conventional design for enclosed, fan-cooled types with the cooling fan located on the shaft extension at the top, opposite the driving end, and slip rings at the bottom end with dust-tight covers and a free outlet for cooling air.

The design was originally conceived to provide special protection under heavy service in direct connection with centrifugal sewage pumps. Other uses are found in locations where special protection is required such as cement mills.

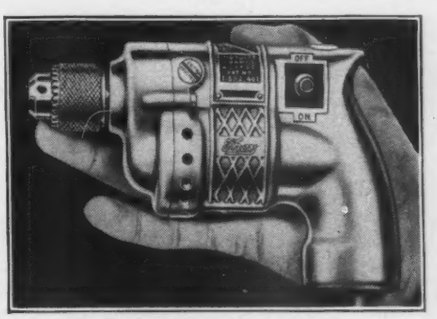


Vertical slip-ring motor

The motors are rated at 75 hp., 690 r. p. m., 208 volts, 3-phase, 60-cycle for continuous duty with 55-deg. temperature rise. The thrust load is taken at the top by a double-row, deep groove radial ball bearing. Lower bearing is also double-row of the self-aligning type. The large mounting base is of all welded construction. Vertical intake is protected against dripping water by a large mushroom-type cover with heavy mesh wire side screens. Steel lifting bails are provided on opposite sides for handling the motor in vertical position.

Small Electric Drill

INDEPENDENT PNEUMATIC TOOL CO., Chicago, Ill., has placed on the market a portable electric drill which weighs 2½ lb., but is claimed to have the same power as tools twice its size. The V-14 has ¼-in. capacity and V-13 has 3/16-in. (thickness drilled). Special features claimed are high-grade ball bearings, heat-treated helical gears, the "Thor" patened ventilating system.



Portable, 2½-lb. drill

Rock Products News Briefs

Prices Bid—Contracts Let

Gallipolis, Ohio: Miller Brothers have been awarded a contract by the Gallia county commissioners for crushed limestone at $1.30 per cu. yd., f.o.b. quarry.

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Denver, Colo.: There were five bidding on 90,000 bbl. of cement; 70,000 were to be used in lining the water bore of the Moffat tunnel, 20,000 for erecting a diversion dam. Colorado Portland Cement Co. was lowest, a bid of $3.19 per bbl. for tunnel lining and $2.74 for the dam work.

◈ ◈ ◈

Brussels, Belgium: Under the direction of the Belgium government, and in order to avoid any semblance of dumping on a monetary devaluation basis, the newly formed cement cartel has thus far maintained export cement prices at prevailing levels before devaluation. For the domestic market, however, a 10% price decrease has been adopted. Efforts will now be made by the Belgian cement industry to reach an agreement with the International Cement Entente, former negotiations with which have come to no avail because of the reluctance of some producers to sign a local agreement.

◈ ◈ ◈

Grundy Center, Ia.: County board of supervisors let contract for supplying and placing 5000 cu. yd. of class B gravel for highway at $1.38 per cu. yd. to Beu & Son, Sumner.

◈ ◈ ◈

Lincoln, Ill.: Contracts for furnishing Laenno township with 20,919 cu. yd. of gravel were awarded to Carl Schweikert and to the George Hoffman Construction Co., Lincoln. Schweikert bid $18,003, on the basis of $1.51 per cu. yd. on section 1 and the Hoffman company bid $14,478, or $1.61 per cu. yd. on section 2.

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Springfield, Ill.: Bidders for 45,000 cu. yd. of gravel for Mt. Pulaski township roads were George E. Hoffman Construction Co., Lincoln, Ill., section 1, $1.40 per cu. yd., $26,615.40; section 2, $1.62 per cu. yd., $42,045.48; section 1 and 2, $1.47 per cu. yd., total $66,098.55. The bid of R. A. Cullinan, Tremont, was: Section 1, $1.65 per cu. yd., $31,368.15; section 2, $1.65 per cu. yd., $42,824.10; sections 1 and 2, $1.54 per cu. yd., total $69,246.10.

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Princeville, Ill.: A contract for constructing a gravel road of 4.0047 miles was awarded to C. L. Swords, Peoria, by the road and bridge committee of county board of supervisors. Bid of $24,133 for washed gravel was the lowest of four received. Estimated cost was $25,263.27. Grading is included in the work to be done. The committee rejected the lone bid submitted by the Central West Construction Co. for the 3.465 miles of similar construction because there were no competitive bids.

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Syracuse, N. Y.: Contract for furnishing and hauling 4000 tons of crushed stone for the municipal airport was awarded to Solvay Sales Corp. at $1.35 a ton. The stone will be used in the TERA project involving construction of new runways. The General Crushed Stone Co. will deliver 800 tons of stone dust at 95c a ton. Joseph S. Caldwell will furnish 380 bbl. of portland cement at $2.58.

◈ ◈ ◈

Fort Peck, Mont.: Becker County Shiely Sand and Gravel Co., Cole, Mont., was only bidder for 500,000 cu. yd. of gravel for toes of Fort Peck dam; price bid 60c per cu. yd.

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Cape Girardeau, Mo.: Contract for five revetment projects on the Mississippi River in Cape Girardeau's immediate vicinity, costing approximately $320,000, have been awarded by the U. S. Engineers office at St. Louis. The work will begin as soon as the river stage permits. Morrison, Glasscock & Connor have contracts for 4400 ft. on three jobs. Other projects are 1000 ft., Massman, Peterman Construction Co.; 4600 ft., Kansas City Bridge Co. Quarries at Cape Girardeau and Keely's Landing will furnish most of the material for these jobs, it is said.

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Viola, Wis.: Contract awarded Clarence Weiss, La Crosse, Wis., for road surfacing in town of Liberty: Shale base course 26,965 cu. yd. at 28c per cu. yd., $7,550.20; crushed stone surfacing 10,335 cu. yd. at $1.04 per cu. yd., $10,748.40.

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Hutchinson, Kan.: Southwest Sand and Gravel Co. awarded contract for 900 cu. yd. of road surfacing gravel at 42½c per cu. yd., f.o.b. pit.

◈ ◈ ◈

Morrison Ill.: Contract let to H. J. Taber & Son, Prophetstown, Ill., for 1200 cu. yd. of road gravel delivered on road at 77c per cu. yd.; three other bids, 89, 97, and 99c.

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Sand and Gravel

Missouri Gravel Co., La Grange, Mo., is reported to be producing and shipping approximately 100 car loads a day, operating 24 hours a day, six days a week. A new clamshell crane has been added to the plant equipment for stockpiling.

Arkansas: The state highway department will file a test case in the state courts to determine the amount of sales tax to be collected on sand and gravel when the state severance tax has already been paid.

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Missouri Gravel Co., Louisiana, Mo.: One of the company's employes was the victim of a fatal accident of an unusual nature, but of a kind that might happen at other plants, so a fairly comprehensive report is published herewith. The exact cause of the accident is not known, but these are the circumstances: The employe, C. B. England was in his car driving home, when in the midst of a puddle of water his car caught fire and he was fatally burned. The car was found in about the center of the narrow lake or pond of water, in water about axle deep. Everything about it that could be burned had been consumed by the flames and the door on the left side through which England made his escape was open and had fallen off its hinges. The heat was so intense that the name plate on the front of the hood and polished metal ornaments on the front fenders were melted, holes being left in places where the ornaments formerly were located. During that afternoon employes of the company were engaged in refilling the storage tank of 11,000 gal. capacity with gasoline from a railroad tank car. A pump was used in transferring the gasoline from the car to the storage tank. At the same time that the large tank was being refilled an underground tank of about 1000 gal. capacity was being filled from the large storage tank, the gasoline being permitted to run by gravity through a pipe from the large tank into the smaller tank, which was only a few feet from the large tank, which rests on a concrete foundation. In being refilled the small tank was overflowed and gasoline ran out on the ground and a portion of it found its way to the small body of water a few yards east of the tanks. Presumably this gasoline floating on the water was ignited by the exhaust of England's car. The smaller tank supplies gasoline for use in tractors and cars of the company is obtained. About 9000 gal. of gasoline were in the large tank. The conflagration which threatened the washing plant centered around the large tank after the gasoline that had found its way to the body of water had been consumed. Heat was so intense that it caused the gasoline in the tank to expand to such an extent that 2600 gal. of gasoline escaped through air vents in the large tank. The plant was saved through the efforts of its own fire-fighting crew.

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Dilles Bottom Sand and Gravel Co., Bellaire, Ohio, is the name of a new corporation which, it is reported, will operate the plant of the former Bellaire Sand and Gravel Co. James W. Dillon, head of the new company is a former county commissioner and for a time was with the Buckeye Sand and Gravel Co., Bellaire.

THE INDUSTRY

New Incorporations

Indian Creek Marble Co., Tazewell, Tenn.; capitalized at $50,000. Incorporators are H. C. Hayes, Elsie Hayes and General Coffey.

Dilles Bottom Sand and Gravel Co., Bridgeport, Ohio; 500 shares no par value. J. W. Dillon, J. E. Fox and H. M. Jones are the incorporators.

Southland Gravel Co., Wilmington, Del.; general mining business; $100,000 and 1000 shares, no par value. Incorporators are M. M. Lucey, H. I. Brown and L. S. Dorsey.

West Virginia Quarries Co., 22 California Apts., Charleston, W. Va.; authorized stock, $5000. Incorporators are G. F. Atkins, V. C. Lytle and W. D. Edwards, all of Findlay, Ohio.

Mineral Products Co., Thomasville, Ga.; to develop fuller's earth deposits in Thomas county, near Ochlochnee; capital, $50,000. Incorporators are Emmett Butler and Peter Warhol.

Calcium Chemical Corp., Pittsfield, Penn.; 1000 shares, no par value. Officers are Joseph W. Ayres, president; M. R. Williams, vice-president; and C. K. Williams, Easton, Penn., treasurer.

Concrete Plank Co., Inc., 15 Exchange Pl., Jersey City, N. J.; to deal in concrete products; authorized capital stock, 1000 shares of common stock without par value. Incorporators are Thomas J. Nolan, Charles R. Gifford and Edward O'Mara.

Fort Dodge Plaster Co., Fort Dodge, Iowa; to operate a general plaster, gypsum, mortar, clay, brick, tile, terra cotta and stucco business; authorized capital stock, $24,000, divided into shares of $100 each. Officers are L. W. Smith, president; Emerett C. Hansen, vice-president; and D. J. Butts, treasurer.

Personals

Miles C. Smith recently joined Colmonoy, Inc., Los Nietos, Calif., as sales manager.

M. S. Heard, chemist of Calaveras Cement Co., addressed the Stockton Engineers, August 9, at Stockton, Calif., on the evolution of portland cement.

Miss Isabel Guy Witherspoon, Clinton, S. C., was married July 19 to **Charles Canizon Foster,** manager of Foster Brothers Dixiana Sand Co., Columbia, S. C.

Walter F. Jahncke, vice-president, Jahncke Service, Inc., New Orleans, La., has been promoted from Norwegian vice-consul to Norwegian consul for Louisiana.

Thomas McCroskey, manager of American Limestone Co., Knoxville, Tenn., has been appointed a member of the Tennessee Rural Electrification Authority, a part of the TVA project.

J. H. Griffith, assistant chemist of Lone Star Cement Co., Kansas, Bonner Springs plant, has been elected vice-president of the local school board. Mr. Griffith has served as clerk and purchasing agent of the board.

Obituaries

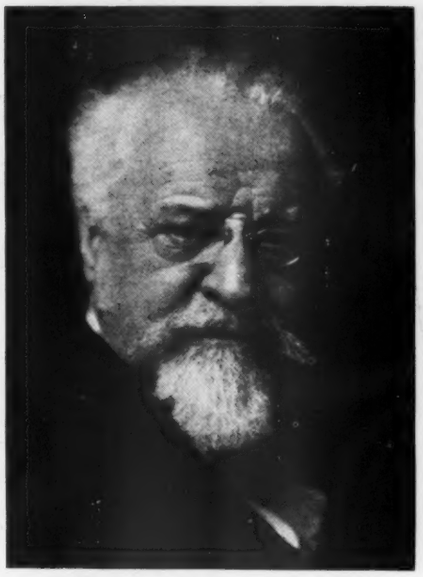
George J. Stubblefield, 69, vice-president of the Estill Springs Sand and Gravel Co., Nashville, Tenn., died July 17, following a month's illness.

William Bacon Schiller, 76, former president of Bessemer Limestone and Cement Co., Youngstown, Ohio, died at his Pittsburgh, Penn., home July 25. He had been in ill health for three years. He retired in 1926.

Robert M. Quigley, 70, advisory director of Fort Worth Sand and Gravel Co., Fort Worth, Tex., died at El Paso, Tex., July 23, of injuries received from an automobile accident a few days before while en route to California on a vacation trip.

Aman Moore, president, Acme Cement Co., Los Angeles, Calif., died of a heart attack July 27 in New York City, where he had gone to complete financing arrangements for his company. He was 58. He was known best as a promoter of new cement plants.

Bruce W. Traylor, 64, crushing and mining engineer and district manager of the southern sales office of Traylor Engineering and Manufacturing Co., Allentown, Penn., died of a heart attack at Louisville, Ky., August 14. Associated with the company since its inception, Mr. Traylor served successively as superintendent, general manager, vice-president and district sales manager.



The late Poul Larsen

William J. Keever, 77, vice-president of the Marble Cliff Quarries Co., Columbus, Ohio, for many years, died July 19 of a heart attack. He retired about 10 years ago.

George F. X. Schwarz, 60, Horse Creek, Wyo., died at Cheyenne, Wyo., July 11 of pneumonia contracted a week after an auto accident which resulted in chest injuries. Mr. Schwarz came to Wyoming in 1908 and was employed by Ingleside Limestone Co., his latest position having been that of local manager.

Walter James Coles, a director of Edgar Allen and Co., Ltd., Sheffield, England, and manager of its engineering department, died July 25, following an operation for appendicitis. Aged 61, Mr. Coles early became connected with the cement business through P. J. Neate, Rochester, Kent., serving as manager of the cement and brickworks-machinery production department. Later, as part of the firm of Maxted, Knott and Coles, Mr. Coles installed the first cement works in his country to be completely driven by electric power. Through his capacity as consulting engineer for cement plants, Mr. Coles made a connection with Edgar Allen and Co., Ltd., and subsequently joined the staff at Sheffield in the engineering department. He was elected to the firm's board of directors in 1923.

Poul Larsen, 76, pioneer in the cement industry, died in Copenhagen, Denmark, May 10. Starting as a mechanical civil engineer in Denmark and in Scotland, Mr. Larsen early joined F. L. Smidth at Copenhagen and became his partner. The firm launched into the engineering of cement plants, and, from 1893 on, Mr. Larsen took particular interest in the United States. He was president of F. L. Smidth and Co. and also head of the boards of numerous cement, lime, iron, wire and concrete works in Denmark and England. He was Doctor of Technology of the Polytechnic Institute in Copenhagen and an officer of the French Legion of Honor. The King of Denmark bestowed on him the order of Commander of Dannebrog. He is succeeded as president of the Smidth company interests throughout the world by his son, Gunnar Larsen.

Crushed Stone

Harrisonville, Mo.: Cass county planning board has asked for two quarry projects from PWA.

Humboldt, Neb.: The city has purchased a rock crusher and hopes to secure WPA funds so that all city streets may be graveled.

Guernsey, Wyo.: The Ingleside limestone quarry reopened recently with an order of 3000 tons of stone for the sugar factory at Bayard, Neb.

St. Mary's, Kan.: The St. Mary's College rock crusher was recently sold to Pottawatomie county for $350.

Mt. Pleasant, Iowa: Henry county officials favor continuing new work relief programs in the form of quarry operations.

Coffeyville, Kan.: One of the Montgomery county crushers was recently installed along the old Chetopa road south of Coffeyville to produce rock for this road.

Macomb, Ill.: The city rock crusher is operating part time to supply crushed chuck for graveling and repairing city streets. The crusher had not been in operation for several months.

Oskaloosa, Iowa: The Mahaska county crusher has been moved to the quarry on the Jacob Dahm farm in Richland township. Lanning Construction Co. was in charge of stripping the quarry.

McPherson, Kan.: The McPherson county rock crusher was reported idle recently because of a lack of men to operate it. Work on the road between Canton and Roxbury has been suspended.

St. Joseph, Mo.: Buchanan county recently sought approval of WPA projects for surfacing 150 miles of road. It is considering buying three or four rock crushers, a plan endorsed by the Automobile Club.

Mound City, Mo.: The Holt county court bought a rock crusher late in July for use on a road project between Forest City and Mound City. The Jim Patterson farm is producing material for a regraveling job.

Riverside, Calif.: A new crusher has replaced the old one at the city quarry on the Elsinore road, and this, with other new machinery, is said to insure steady output of rock and gravel for many months to come.

Osawatomie, Kan.: The city purchased a new rock crusher in August from Rogers Iron Works Co., Joplin, Mo., to replace the one which had been in use for six years. The crusher and elevator cost approximately $1500.

Independence, Mo.: Both Jackson county rock quarries were closed recently because there was a sufficient amount of material on hand to meet needs and because the court wished not to exceed the budget provided for the work.

Reinbeck, Iowa: The rock quarry in German township, Grundy county, was shut down in July to reduce the cost of keeping the WPA labor at work and to give the men an opportunity to find employment on farms for the harvest season.

Caledonia, Minn.: The Minnesota Rural Rehabilitation Corp., sponsoring the Houston county quarry project, recently began grinding limestone at the John Henry quarry in Mayville township. The price of the stone at the grinder is 85c a ton.

Perry, Kan.: The Jefferson county rock crusher is operating on the Gast farm, north of Williamstown for material to be used on the Quigley road. The crusher will be moved to the Stines farm next, where rock will be crushed for a road to Perry.

Ed Wahl, Victor, Iowa, who was awarded the contract for placing crushed stone on 12 miles of new Washington county road and 30 miles of maintenance surfacing, recently started crushing operations at the Grace Hill quarry. Work had been delayed by wet weather.

Toledo, Ohio: Lucas county commissioners were recently considering a plan for securing stone from the city-owned quarry at Whitehouse for use on WPA projects. About 225,000 tons of stone will be required. The officials were considering also the purchase of an 800-ton crusher.

Moberly, Mo.: The new $3900 Randolph county rock crusher has been set up on the Mary E. Edwards farm southeast of Mt. Airy, where the first county quarry has been established. Mrs. Edwards is making no charge for rock taken from her farm for use on the road project.

Vinton, Iowa: About a dozen men have been put to work with J. G. Vernon, contractor of Marion, Iowa, at the Miller quarry east of Vinton to provide material for state and Benton county roads. Mr. Vernon recently completed county work at the Shafer quarry west of Mt. Auburn.

Fairfield, Iowa: The Carl Anderson quarry was reopened in July after a shutdown since last winter to supply gravel for surfacing the Fairfield-Salina-Germanville graded trunk road. A stone quarrying project for Jefferson county, calling for an expenditure of $12,427, and involving the quarrying of 6000 cu. yd. of stone from a quarry south of Libertyville, has been presented for consideration to Iowa state relief leaders.

"We are sold on the TIMKEN ROCK BITS 100%

says the STANDARD SILICA CO.

STANDARD SILICA COMPANY

A. C. GOODNOW, PRESIDENT
J. S. TENDICK, SEC'Y & TREAS.

400 WEST MADISON STREET
CHICAGO

PLANTS
OTTAWA, ILLINOIS

Rock Bit Division,
Timken Roller Bearing Co.,
Canton, Ohio.

April 19, 1935.

Dear Sirs:

We have been using the Timken Rock Bit in our quarries located at Ottawa, Illinois, for the past nine months and we would like for you to know the results we are having.

We drill to a depth of sixteen feet in silica sand rock which gives us a real problem in drilling. With the old type of forged steels our best drill footage per steel was 200 feet, whereas we are getting 420 feet with our Timken Bit. Each bit costs us approximately one quarter of the cost of resharpening one steel so the saving to us by using the Timken Bit is obvious. Your bit also gives us a much cleaner hole than we were able to get with the old type of drill steel.

Their convenience is not to be overlooked. It is much easier to change bits on the steels than to carry the steels out of the quarry to be sharpened and back again.

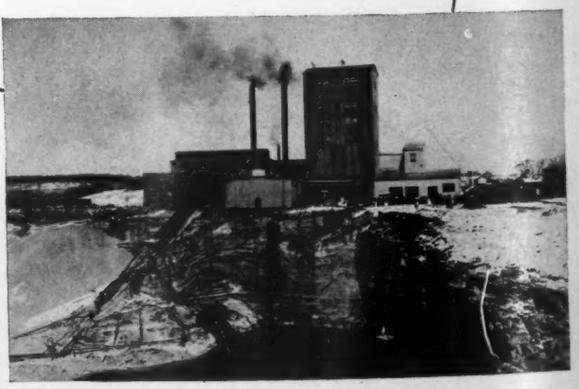
We are sold on the Timken Rock Bits 100% and our genuine enthusiasm for your product prompts us to write you this letter, and tell you that we would not be without it.

Yours very truly,

Standard Silica Company.

By F. D. Chadwick

F. D. Chadwick, Supt.



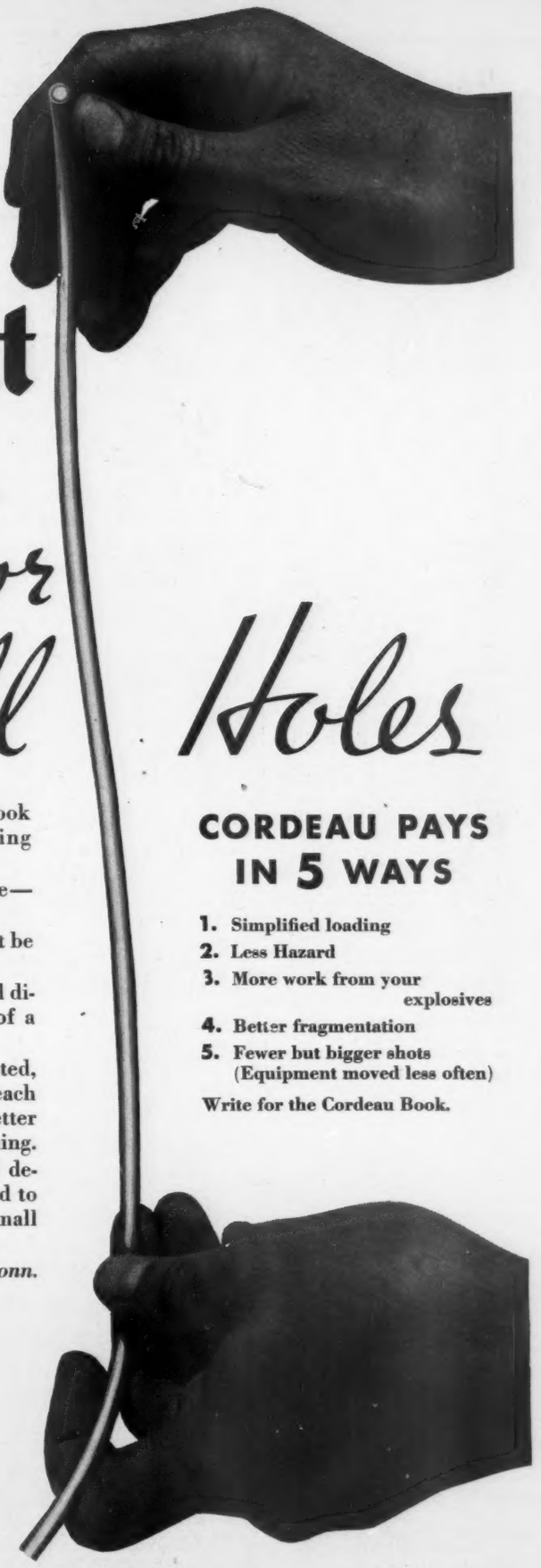
THERE are few tougher jobs for rock bits than drilling silica rock, and probably no more severe test of the ability of a bit to hold its gauge and cutting edge. The experience of the Standard Silica Company, as expressed in this letter should therefore be of especial interest to everyone confronted with a major rock drilling problem. It will pay you to read it carefully.

Complete Stocks Maintained In Principal Distributing Centers

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN BITS

Let's Look at Cordeau -/- for Well Drill Holes



Big holes, big powder—a big job any way you look at it. But the use of Cordeau-Bickford Detonating Fuse means:

Simplified Loading: No cap in the cartridge—Cordeau itself is the detonator.

Less Hazard: Cordeau is insensitive—it must be detonated in order to detonate!

More Work: Each cartridge, being detonated directly by the Cordeau, has the added force of a primer cartridge.

Thousands of well drill holes, Cordeau detonated, can "go" as one giant blast, yet be so planned that each row relieves the burden for succeeding rows. Better fragmentation means easier removal—easier crushing.

Send for the Cordeau Book. It illustrates and describes a technique in blasting that can be applied to Jackhammer and Wagon Drill holes too, for small shots as well as larger ones.

THE ENSIGN-BICKFORD COMPANY, *Simsbury, Conn.*

CORDEAU PAYS IN 5 WAYS

1. Simplified loading
2. Less Hazard
3. More work from your explosives
4. Better fragmentation
5. Fewer but bigger shots (Equipment moved less often)

Write for the Cordeau Book.

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ALSO SAFETY FUSE *Since* 1836

CB-46

THE ENSIGN-BICKFORD COMPANY

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For alphabetical index, see page 2

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Manhattan Rubber Mfg. Division of Raybestos – Manhattan, Inc.

Acetylene Welding Rod
American Steel & Wire Co.

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F. L. Smidth & Co.

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Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.
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Fuller Co.

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Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.

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Backfillers
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Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

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S K F Industries, Inc.

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Timken Roller Bearing Co.

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Timken Roller Bearing Co.

Bearings (Tapered Roller)
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Bearings (Thrust)
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Timken Roller Bearing Co.

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Belting (Transmission)
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Belting (V Type)
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Link-Belt Co.
Robins Conveying Belt Co.
Traylor Eng. & Mfg. Co.

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Traylor Eng. & Mfg. Co.

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Atlas Powder Co.
Halafax Explosives Co.

Blasting Powder (See Powder, Blasting)

Blasting Supplies
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Halafax Explosives Co.

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Link-Belt Co.
S K F Industries, Inc.
Timken Roller Bearing Co.

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Babcock & Wilcox Co.
Combustion Engineering Corp.

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Manhattan Rubber Mfg. Div. of Raybestos – Manhattan, Inc.

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Smith Engineering Works
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Wellman Engineering Co.

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Bucyrus-Erie Co.
Pioneer Gravel Equipt. Mfg. Co.
Wellman Engineering Co.

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
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Cement Process Corp.

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Industrial Brownhoist Corp.
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Lima Locomotive Works, Inc (Ohio Power Shovel Co.)
Link-Belt Co.

Cranes (Excavator
Koehring Co.

Cranes (Overhead Traveling Electric)
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Crushers (Hammer)
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The suspension bearing and enclosed gears on large grinders can be insured against failure, and maintenance costs can be lowered by using the right Gulf lubricants.
The use of Gulf quality lubricants will minimize wear on heavy duty plain bearings and assure uninterrupted operation of expensive crusher equipment.

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HERE is *one big advantage* in using Gulf quality lubricants for your heavy duty equipment—from Gulf's broad line of oils and greases, exactly the right type of lubricant can be applied to each bearing, gear and moving part of all your equipment.

Leading mill and quarry operators are reporting substantial economies from the use of Gulf products. For example: one eastern Pennsylvania cement plant reports that Gulf lubrication has been an important factor in bringing about the following savings:

(1) *Reduced Power Consumption.*
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(3) *Elimination of Waste of Lubricants.*

A Gulf engineer will be glad to confer with you and recommend improved lubrication practice in your plant.

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Please supply me with information regarding lubricants for the following equipment.....

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For alphabetical index, see page 2

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Bucyrus-Monighan Co.

Draglines (Gasoline or Electric)
Koehring Co.

Dragline Excavators
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
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Dredges
Bucyrus-Erie Co.
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Worthington Pump & Machy. Corp.

Drills, Hammer (See Hammer Drills)

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills (Rock)
Worthington Pump & Machy. Corp.

Drill Steel
Worthington Pump & Machy. Corp.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Eng. & Mfg. Co.

Dumptors
Koehring Co.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.

Dust Conveying Systems
Fuller Company

Dynamite
Atlas Powder Co.
Halafax Explosives Co.

Electric Cables and Wires
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Engineers
Bonnot Company
Hetherington & Berner, Inc.
Productive Equipment Corp.
F. L. Smidth & Co.

Engines (Diesel)
Nordberg Mfg. Co.
Worthington Pump & Machy. Corp.

Engines (Gasoline, Kerosene and Oil)
Worthington Pump & Machy. Corp.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.
Halafax Explosives Co.

Fans
General Electric Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Chain Belt Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc.
Pioneer Gravel Equipt. Mfg. Co.
Smith Engineering Works (Plate)

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.
Halafax Explosives Co.

Fuses (Electrical)
General Electric Co.

Gaskets
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.

Gasoline
Texas Company

Gears and Pinions
Chain Belt Co.
General Electric Co.
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples (Stone)
Hayward Co.

Grease
Gulf Refining Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.

Grizzlies
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Hammer Drills
Worthington Pump & Machy. Corp.

Hammer Mills (See Crushers)

Hoists
Harnischfeger Corp.
Link-Belt Co.
Pioneer Gravel Equipt. Mfg. Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Firestone Tire & Rubber Co.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.

Insulation (Electric)
General Electric Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills). See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Link-Belt Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Steam, Gas and Electric)
General Electric Co.

Locomotives (Storage Battery)
General Electric Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
American Steel & Wire Co. (Wire Rope)
Broderick & Bascom Rope Co. (Wire Rope)
Gulf Refining Co.
Macwhyte Company
Texas Company

Machinery Guards
Harrington & King Perforating Co.

Magnets
General Electric Co.

Manganese Steel Castings
The Frog, Switch & Mfg. Co.

Mechanical Rubber Goods
Firestone Tire & Rubber Co.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
F. L. Smidth & Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bonnot Company
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mine Handling Equipment
Chain Belt Co.

Mixers (Concrete)
Koehring Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
General Electric Co.
Harnischfeger Corp.

Nozzles (Gravel Washing)
Chain Belt Co.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Oils (Lubricating)
Gulf Refining Co.
Texas Company

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Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.

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Texas Company

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Koehring Co.

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KOEHRING COMPANY

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Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 2

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.
Morrow Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Conveyors
Fuller Company
Link-Belt Co.
Robins Conveying Belt Co.

Portable Compressors
Worthington Pump & Machy. Corp.

Portable Crushing and Screening Unit
Good Roads Machy. Corp.
Pioneer Gravel Equipt. Mfg. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Powder (Blasting)
Atlas Powder Co.
Halafax Explosives Co.

Power Transmission Equipment
Chain Belt Co.
S K F Industries, Inc.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons
Worthington Pump & Machy. Corp.

Pumps (Dredging)
Bucyrus-Erie Co.
Morris Machine Works
Worthington Pump & Machy. Corp.

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
Morris Machine Works
A. R. Wilfley & Sons
Worthington Pump & Machy. Corp.

Quarry Bars
Worthington Pump & Machy. Corp.

Railways (Electric)
General Electric Co.

Railway Equipment
General Electric Co.

Ready Mixed Concrete (Truck Mixer Bodies)
Blaw-Knox Co.
Chain Belt Co.

Rims (Wheel)
Firestone Tire & Rubber Co.

Road Machinery
Harnischfeger Corp.
Koehring Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
S K F Industries, Inc.
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Rubber Molded Goods
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scrapers (Power Drag)
Harnischfeger Corp.
Link-Belt Co.
Sauerman Bros.

Screens
Allis-Chalmers Mfg. Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Ludlow-Saylor Wire Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Link-Belt Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers
Hardinge Company, Inc.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Company

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.
Robins Conveying Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Sprockets and Chain
Chain Belt Co.

Steel (Abrasion Resisting)
Joseph T. Ryerson & Son, Inc.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

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Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
Link-Belt Co.
Worthington Pump & Machy. Corp.

Tires and Tubes
Firestone Tire & Rubber Co.

Tire Repair Materials
Firestone Tire & Rubber Co.

Track Equipment
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Kansas City Hay Press Co.
Koehring Co.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trukmixers
Blaw-Knox Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
Nordberg Mfg. Co.

Valves (Pump)
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
Worthington Pump & Machy. Corp.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Eagle Iron Works
Hardinge Company, Inc.
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Waste Heat Boilers
Combustion Engineering Corp.

Weigh-Mix
Koehring Co.

Welding and Cutting Apparatus
General Electric Co.
Harnischfeger Corp.

Welding Rod
American Steel & Wire Co.
Joseph T. Ryerson & Son, Inc.

Welding Wire
American Steel & Wire Co.
John A. Roebling's Sons Co.

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American Steel & Wire Co.

Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
Ludlow-Saylor Wire Co.
National Wire Cloth Co.
John A. Roebling's Sons Co.

Wire Rope
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
Macwhyte Company
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)

$ YOUR PROFIT $

DEPENDS ON THE MATERIAL THAT PASSES THRU YOUR SCREEN ! ! !

— NOT THE MATERIAL THAT PASSES OVER YOUR SCREEN —

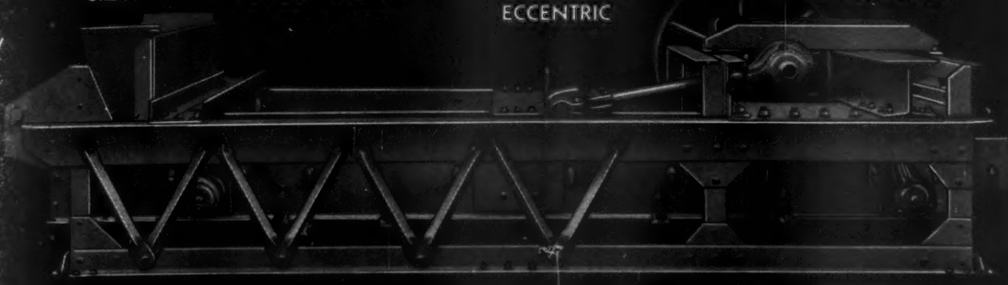
2-3-4 SIZES

CLOSER TOLERANCES

SINGLE OVERHEAD ECCENTRIC

S K F BEARINGS

LOW HEADROOM



MORE TONS PER SQUARE FOOT

PIONEER — **HORIZONTAL** — GRADATION SCREEN

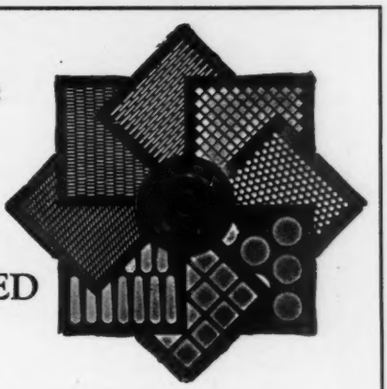
And the result as one satisfied customer expressed it:

"That wonder and ever present uneasy feeling, as to whether the stone will meet specifications, has changed to pleasant confidence in the use of this screen."

Let us show you what this screen can do for you, on your job.

PIONEER GRAVEL EQUIPMENT MFG. CO., MINNEAPOLIS, MINNESOTA

This Time Try HENDRICK PERFORATED PLATE



In the unusually complete Hendrick line of Perforated Plate for vibrating screens you will find your every screening need fulfilled . . . whether flat plate in any standard or special perforation . . . or the long-life, High-Carbon, Heat-Treated, Double-Corrugated Plate. Write, phone or wire Hendrick, Carbondale.

HENDRICK MANUFACTURING CO.

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PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Elevator Buckets of all types, Mitco Open Steel Flooring, Mitco Shur-Site Treads and Mitco Armorgrids. Light and Heavy Steel Plate Construction.

AMERICAN *ROLLING RING* CRUSHER

Front View Showing Breaker Plate Adjustment

LOW FIRST COST makes the American Crusher a prime investment. Easy to install, dismantle and move.

LOWER OPERATING COST because the American takes less power per ton of product. Flexible rotor assures protection from injury of tramp iron.

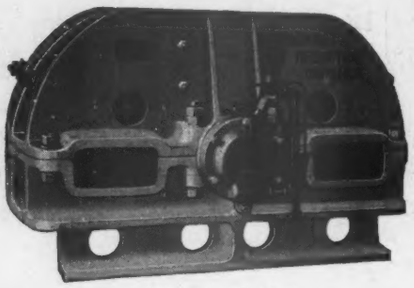
LOWER MAINTENANCE COST as the Rolling Rings wear many times longer than hammer surfaces.

Write today for facts on why the American Rolling Ring Crusher gives a more uniform product, with minimum fines and no slivers or chips.

AMERICAN PULVERIZER COMPANY

1245 Macklind Ave. St. Louis, Mo

BONNOT REDUCTION CRUSHERS



Save from Many Angles

There is the uniform distribution of wear over the entire crushing area that increases the life of wearing parts. BONNOT crushers produce tremendous tonnage at high speed with low power consumption.

Finished product is more uniform in size and cubical with practically no oversize slabs or fines. Aggregate produced is minus flaws and cracks.

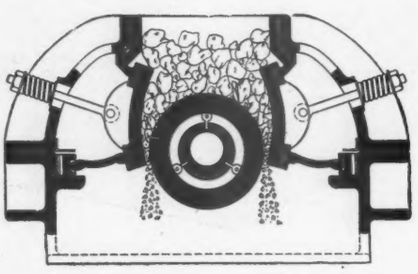
Additional Reasons for Economy

Manganese Wearing Parts—Reversible Concaves — Cast Steel Frame — Bronze Sleeve Bearings — Renewable Liners — Extra Large Shaft—Positive Pressure Lubrication—Cast Iron Safety Plates.

Users Say:

"We take pleasure in recommending this crusher."—Ohio.

"We believe that you have a knockout in the line of crushers."—Texas.



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Not a roll crusher. Featuring slow creep mantle for distribution of wear

Manufactured under U. S. Patent No. 1946763

THE BONNOT CO.
CANTON, OHIO

New York Office: 30 Church St.
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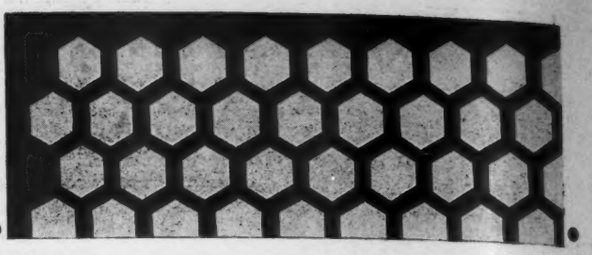

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More Holes than Round
More Accurate Sizing than Square

4004	4788
Round Holes in Plate 37½" x 60" 3/16" Bar	Hexagon Holes in Plate 37½" x 60" 3/16" Bar

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CARBONDALE, PA. Manufacturing Plant and General Offices

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LINK-BELT VIBRATING SCREEN

ALL materials, fine or coarse, light or heavy . . . clay, gravel, sand, ores, stone, etc. . . . yield to the wizardry of the mechanically-vibrated, Link-Belt Vibrating Screen, and classify themselves in strict accordance with their size. Its uniform vibration keeps the meshes open, and makes the screen's entire screening surface 100% effective. Send for Book No. 1462.

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Industrial Brownhoist Buckets are built in capacities of from 1/2 to 15 yards, for rehandling or excavating service.

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POWER-WHEEL
LINK TYPES

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INDUSTRIAL BROWNHOIST
CLAMSHELL BUCKETS

ALL ROAD EQUIPMENT MOVES FASTER!

Your excavator is the spear head of attack on road construction jobs. If it fails, all equipment along the line may have to mark time. That's where P&H speed and stamina show up with continuous high speed production.

This year's road building jobs will be awarded on the basis of the lowest cost per mile. High speed equipment will figure in every bid. Contractors who have the advantage of these modern and advanced P&H features will be in the running on any job. That's why you should investigate them now...There's a P&H working somewhere near you. We'll be glad to tell you where. Watch it hit its stride and see the difference. There's a model for every kind of road job. Write for details on specific sizes.

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(Model 100—½-yd.)
A new, full-revolving machine that is lighter and faster with all-welded construction. Swift travel, easy steering and quick turning give it tractor mobility. P&H proved features give it dependable high speed production. It's fully convertible at a new minimum of expense. Bulletin No. 100 has complete specifications. Write for your copy.

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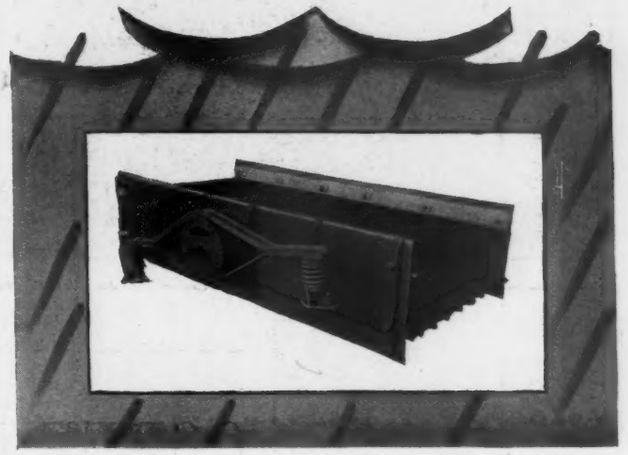
SAME YARDAGE WHEN IT RAINS



ROBINS VIBREX SCREENS

They are adjustable . . . adjustable as to pitch as well as to stroke. Damp weather, therefore, does not slow up the user of a Robins Vibrex Screen. A few minutes with a wrench and the screen is set for maximum production, irrespective of the condition of the material. Robins Screens are noted for their substantial construction, low power consumption, high capacity under all conditions, and reasonable prices.

Showing slope adjustment and adjustable Weight Arm.

●

The Robins engineer will be glad to call and demonstrate the various advantages of Robins Vibrex Screens and other Robins products. If your requirements are unusual, special features will be suggested so that you enjoy the greatest production with lowest costs.

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Screens
Belting
Bin Gates
Bucket Elevators
Robins-Oro Manganese
Feeders

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EQUIPMENT

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Firm .....
Address .....
Town ..... State.....

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PIPE LINE ACCESSORIES

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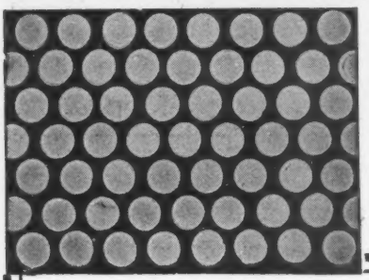
701-745 KENTUCKY AVENUE -- -- -- -- INDIANAPOLIS, IND.



MORROW SCREEN PLATES

Durable—accurate and available in a large variety of sizes in round, square, oval and diagonal slot perforations.

MORROW SCREEN PLATES have for years given the utmost in service satisfaction in the sizing and preparation of coal, sand, gravel, stone and other bulk material.

Our experience as specialists in screening machinery is your guarantee of absolute satisfaction. Deliveries are always prompt.

Ask for our literature.

The Morrow Manufacturing Co.
Wellston, Ohio

ONE METHOD OF SEPARATION

The old 49'er had little choice as to the separation method he used. He was satisfied to "get by".

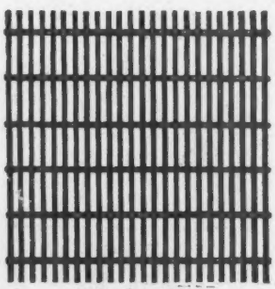
The exacting demands imposed by present-day standards call for screens that not only assure the utmost in efficiency but economy as well.

For years, many experienced operators have depended upon UNIVERSAL Vibrating Screens for their profits—they have re-ordered again and again. Today the Late Model UNIVERSAL Super-Vibrators are more than fulfilling expectations. Their extreme simplicity, ruggedness, quiet operation and low operating cost and accuracy of separation, makes them a good investment at any price.

Yet the Late Model UNIVERSAL Super-Vibrators COST LESS.

If interested in saving money on purchase price—on power and maintenance — WRITE FOR FACTS.

UNIVERSAL VIBRATING SCREEN CO.
RACINE ~ ~ WISCONSIN



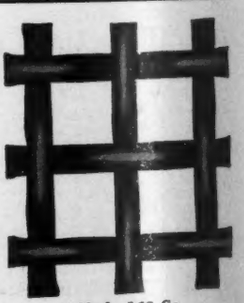
Rolled Slot

WEAR-RESISTING!

BECAUSE MADE OF

ALLOY No. 2

an alloy enabling our "Cleveland" Screens to withstand tremendous punishment due to vibration and abrasion and continue in service long after ordinary screens would have reposed on the junk pile. That means dollars saved—higher capacity—greater accuracy and fewer replacements. Available in Square Mesh and Rolled Slot.



2 Mesh .162 Ga.

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THE CLEVELAND WIRE CLOTH & MFG. COMPANY
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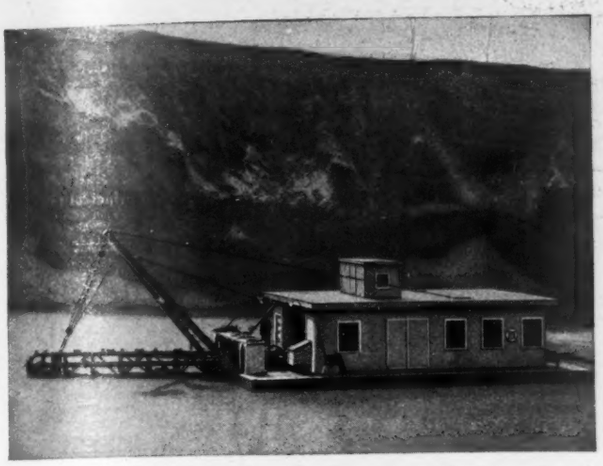
COSTS LESS

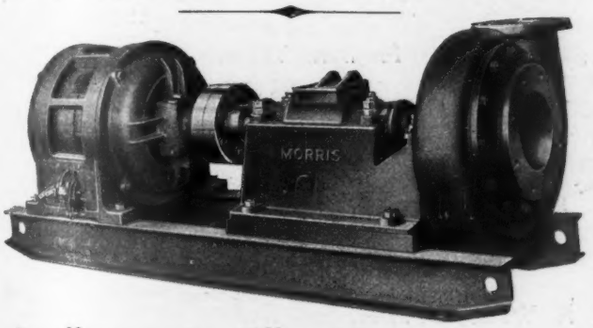
The MORRIS HYDRAULIC COLUMN

News of interest to Centrifugal Pump Users



A problem and its solution . . .

It was a fine sand and gravel deposit, but compacted to almost rock-like consistency. Four producers tried to work it and failed—their dredges could not dig into it. Along came the fifth producer. They put the problem up to Morris. ***The solution***—a Morris Dredge with traveling screen and spikes which broke up the material into masses which could be handled by the dredge. P. S. The producers working in adjacent pits later ordered two similar Morris Dredges.



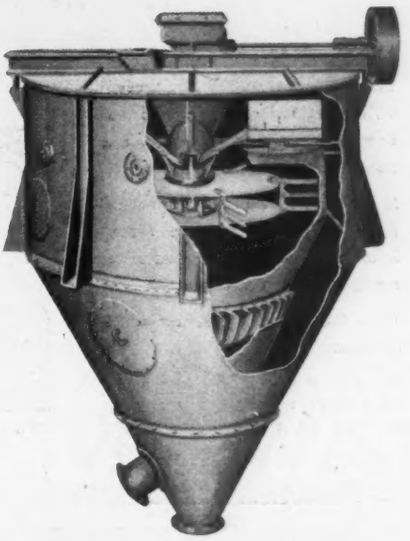
An "international" pump . . .

Morris Centrifugal Pumps have characteristics that make them kin to many peoples. In economy of expense they are Scotch; in strength and ruggedness they are Scandinavian; in quiet, uncomplaining service they are Chinese; in smoothness and polish of finish they are French; in endurance they are Indian; in efficiency of operation they are American, and in exceptional longevity they are Bulgarian. This combination of characteristics will serve you well in your pumping requirements. Bulletins that tell the whole story will be sent on request.

For authoritative recommendations on any pumping or dredging problems, write to Morris Machine Works, Baldwinsville, N. Y.

Export Office: 30 Church St., New York

THE NEW MODEL BRADLEY AIR CLASSIFIER



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SOMETHING NEW IN SEPARATORS

Ask us about this new, important improvement which has astounded users.

If you want the latest improvements in Air Separation, you will surely buy A BRADLEY AIR CLASSIFIER.

LARGER OUTPUTS

BETTER FINENESS

BETTER CLASSIFICATION

BRADLEY PULVERIZER CO.

Boston **London**

Works: ALLENTOWN, PA.

Industrial Enemy No. 1

DUST

Experienced Blaw-Knox Dust Collection Engineers will gladly present, without obligation, a sound and economical plan for complete dust removal in your plant.

In more than two hundred installations Blaw-Knox Dust Collectors have been unhesitatingly specified as meeting demands in every particular.

Write today and obtain immediate cooperation.

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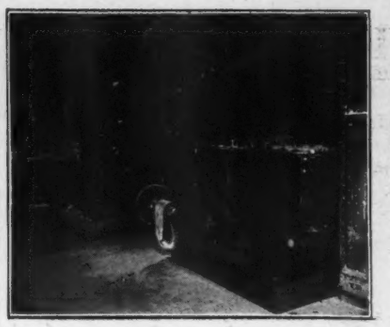
BLAW-KNOX

"PENNSYLVANIA" *STEELBUILT*
SINGLE ROLL CRUSHER and HAMMERMILL



Put Your Reduction Problems Up to Us.

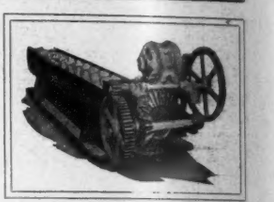
preparing "Easywork" Lime from R.O.K. Lump.

"Pennsylvania" *STEELBUILT* Primary and Secondary Crushers of the Single Roll, Hammermill and Jaw types are specialized for the preparation of Limestone for Stack and Rotary Kilns, for Cement Making, for Aggregate, and for Road Material.

Unbreakable Steel Construction
Positive Tramp Iron Protection

PENNSYLVANIA CRUSHER COMPANY
Liberty Trust Building
PHILADELPHIA, PA.
Branches in principal cities.

Why ship dirty stone when it can be made clean easily and economically?



SCRUBBER

This scrubber will do the good work.

State Capacity Required!

LEWISTOWN FOUNDRY & MACHINE CO.

Mfrs. of Sand Crushing, Grinding, Washing and Drying Machinery

LEWISTOWN - - - - - PENNA.

McLANAHAN PRODUCTS

Single, Double Roll Crushers—Super Dry Pans—Steel Leg Washers and Scrubbers—Dryers—Jigs—Screens—Hoists, Elevators and Conveyors—Reciprocating Feeders, Bingates, Chutes, Turn Tables, Elevator Buckets, Car Pullers, Rail Straighteners, Cast Parts, Rough or Finished—Car Wheels and Brake Shoes, Sprockets and Sheaves, Gears and Bearings, Gratings and Columns, Chute Linings, Grate Bars of Special Heat-Resisting Metals.

Write for catalogues listed or for information concerning any of the material, machinery and castings listed, required in mine, quarry or pit.

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Manufacturers—Founders—Machinists
Hollidaysburg (Established 1835) Pennsylvania

WILFLEY Centrifugal SAND PUMP
PATENTED
for Slurry
for Sand Tailings

ELIMINATION of stuffing box has done away with many troubles common to centrifugal pumps.

Pump maintains extraordinary efficiency.

Pumping parts unusually heavy, insuring long life.

Cleaning out pump or changing wearing parts requires only a few minutes.

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New York Office: 1775 Broadway

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Make the most of 1935 and the years to follow by installing these large capacity crushers wherever there is a tough reduction problem to be met economically. The DIXIE handles material direct from the quarry no matter how wet or sticky, without clogging the feed. The special moving breaker plate gives twenty-six times the wearing area of any standard type of breaker plate. Reduces material to any uniform given size in a single operation. 40 sizes for any capacity—Primary—Secondary or Fine Reduction. Write.

DIXIE MACHINERY MFG. COMPANY
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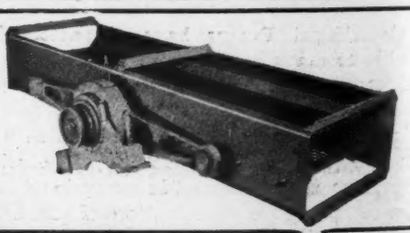
JIGGER SCREEN



The Heavy-Duty "JIGGER"
CONTROLLED VIBRATION
Efficient — Rugged — Economical
WRITE FOR BULLETIN NO. 1233.
Productive Equipment Corporation
210 E. Ohio Street CHICAGO, ILL.

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LONG RANGE MACHINES

Sauerman Slacklines and Drag Scrapers are designed to dig and convey any distance up to 1,500 ft. at lowest cost per ton.

There is a type of Sauerman machine for under-water excavation, another for digging from a bank, another for stock-piling and reclaiming, and so on. Handling capacities range from 10 to 1,000 tons per hour.

A new descriptive booklet with over 100 illustrations is yours for the asking.

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WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
202-204 Fulton Street
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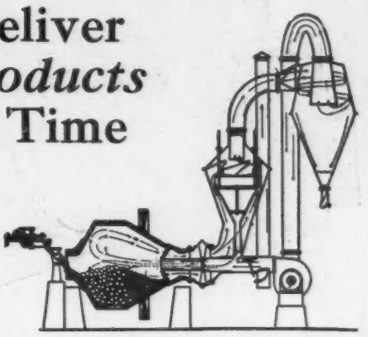
HARDINGE

AIR CLASSIFYING GRINDING MILLS

Will Deliver *Two Products* At One Time



The fines are discharged from the product collector. The oversize, cleaned of the fines, can be taken out of the classifier or returned to the mill for regrinding.

Ask us about this flexible, low cost system and for Bulletin No. 13C

HARDINGE COMPANY
INCORPORATED
YORK, PA.—Main Office & Works Chicago—205 W Wacker Drive
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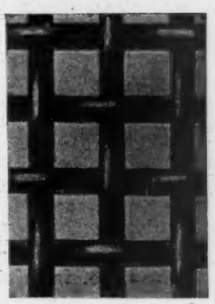
NATIONAL SPECIAL
"NAT-ALOY"



Wears five times as long as cloth made of ordinary steel.
Withstands vibration without crystallization.
Super-tough to resist abrasion.
Maintains accuracy throughout life of screen.
Has outworn other special alloy cloths.

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National Wire Cloth Co.
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Write for new catalog

Perforated Metals—Screens of All Kinds—For Sand, Gravel, Stone, Etc.

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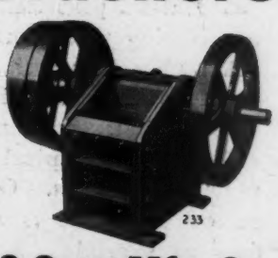
CHICAGO PERFORATING CO.
2427 to 2445 West 24th Place
Tel. Canal 1450 CHICAGO, ILL.

Ehrsam Crushers
Roll Jaw Type



A full series from 8"x12" up. Plain bearings and roller bearings. Can be furnished mounted on trucks with or without elevator and power.

Elevating, Conveying and Power Transmission Machinery, Screens and Scrubbers, Complete Plaster Mills.

The J. B. Ehrsam & Sons Mfg. Co.
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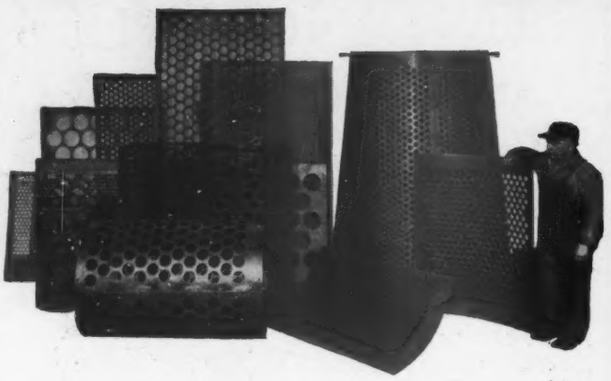
Chicago Rep.: W. H. Kent, 431 South Dearborn Street

MANGANESE STEEL CASTINGS
for the
Rock Products Industry

On Your Next Inquiry Specify
"INDIAN BRAND"
Known For Its Superior Shock and Wear Resisting Qualities.

The Frog, Switch & Mfg. Co.
Established 1881 Carlisle, Pa.

SCREENS
of Perforated Metal



For Sand, Gravel, Stone and Ore. Perforations of all standard types, also of unusual sizes and layouts to give large production and reduced screening costs.

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PRODUCE HIGH STRENGTH AND ALL TYPES OF MASONRY

CEMENTS
by the new process!

Inquiries invited from producers of cement, lime and allied products.

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All processes patented in U. S. and other countries.

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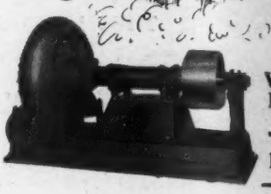
Heavy-Duty (Ball-Bearing) *Sand and Gravel* PUMPS

High efficiency—low operating cost — precision workmanship — wear-resisting, non-heating bearings even when operated under extremely high heads.



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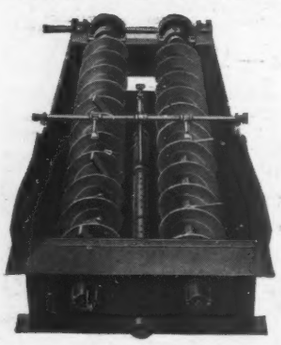
KANSAS CITY HAY PRESS CO.
KANSAS CITY, . . . MO.

EAGLE WASHERS



Single and Double
Spiral Screw and Log Type

Guaranteed removal of trash, sticks, leaves, coal, silt, mud-balls,—to the difficult clay-balls and iron oxide conglomerates.

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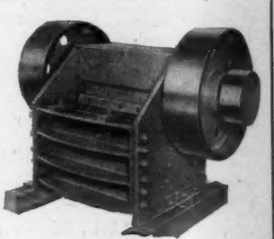
GRUENDLER CRUSHERS & PULVERIZERS

are preparing rock for *Cement Mill* or *Aggregates.* Uniform and at less cost per ton, due to improved features, in any capacity from 10 tons to 4,000 tons daily.

All steel construction and low upkeep cost. Also manufacture Hammer Mills, Ring Mills, Roll Crushers, Jaw Crushers, Screen and Conveying equipment of most rugged design for long life.



50 years of faithful service.
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GRUENDLER CRUSHER & PULVERIZER CO.
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Good Roads MACHINERY

CHAMPION ROLLER-BEARING ROCK CRUSHERS
FEEDERS—ELEVATORS—CONVEYORS—SCREENS
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FOR CRUSHED ROCK—SAND AND GRAVEL

GOOD ROADS MACHINERY CORP.
KENNETT SQUARE PENNSYLVANIA.

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Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

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IMMEDIATE SHIPMENT FROM STOCK

When steel is needed in a hurry you can depend upon Ryerson for quick action. Complete stocks of all kinds of steel products, including Ryerson Abrasion Resisting Sheets and Plates, bars, structurals, bolts and nuts, rivets, boiler fittings, chain, etc. Order from the nearest plant. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

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SPEED--POWER for Bigger Payloads!

The Williams "Champion" Bucket is FASTER because of shorter cable overhaul between bucket-fulls —and SUPER POWERFUL due to exclusive power-arm combination of lever and block-and-tackle. We also build Williams Multiple-Rope Clamshell and Dragline Buckets. *Write for bulletins.*

THE WELLMAN ENGINEERING CO.
7008 Central Ave., Cleveland, Ohio

WILLIAMS · BUCKETS ·

TRU-LAY *Preformed* BREAKS THE RECORD

. . . . moves more tons with less rope cost

● TRU-LAY *Pre*formed Wire Rope breaks the performance record of *non*-preformed ropes. At one operation after another it is reducing wire rope costs. Reducing idle time while ropes are being replaced. Making sheaves and drums last longer. Making faster, steadier production possible. Write for full information.

AMERICAN CABLE COMPANY, Inc., Wilkes-Barre, Pa.
An Associate Company of the American Chain Co., Inc.
In Business for Your Safety
District Offices: Atlanta Chicago Denver Detroit New York Philadelphia Pittsburgh Houston San Francisco

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Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

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LOCOMOTIVES
STANDARD GAUGE

30-ton American 4-wheel saddle tank.
33-ton Vulcan 4-wheel saddle tank.
36-ton Porter 4-wheel saddle tank.
40-ton Baldwin 4-wheel saddle tank.
40-ton Davenport 4-wheel saddle tank.
40-ton American 4-wheel saddle tank.
50-ton American 4-wheel saddle tank.

All equipped with Code Boilers, thoroughly rebuilt and ready for immediate shipment.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
BIRMINGHAM, ALABAMA

FOR IMMEDIATE DISPOSAL
Entire Equipment of the Water Street Trap Rock Co.

1—36"x18" Farrel "B" Jaw Crusher.
1—24"x13" Farrel "B" Jaw Crusher.
1—10"x10" Ingersoll-Rand ER—1 Compressor with 40 h.p. motor and drive.
1—48"x18' Farrel-Bacon Revolving Rock Screen with assorted jackets.
1—36"x16' Farrel-Bacon Revolving Rock Screen with assorted jackets.
1—125 h.p. Westinghouse Slip Ring Motor, 220 V—600 r.p.m.
1—100 h.p. Westinghouse Slip Ring Motor, 2200 V—850 r.p.m.
1—40 h.p. GE Induction Motor, 2200 V—1750 r.p.m.
1—5 h.p. Star Electric Induction Motor—220/440 V—1020 r.p.m.
1—25 KW Allis Chalmers Generator, 250 V —100 amp.—1150 r.p.m.
3—50 KVa Westinghouse Transformers, 2200—220 volts.
2—5 KVa Westinghouse Transformers, 1200/2400—220 volts.
1—Marion No. 7 Gas Electric Shovel, caterpillar mounted, with 1 cu. yd. dipper.
1—P & H No. 206 Gas Shovel, caterpillar mounted, with ¾ cu. yd. dipper, 40' crane boom and ¾ cu. yd. clam shell, and 1 cu. yd. dragline bucket.
Drills, jack hammers, small pumps, misc. quarrying items.

S. B. MAXIMON
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FOR SALE

12—5-yd. 36" ga. Western Dump Cars.
6—2-yd. 36" ga. Koppel Steel V Dump Cars.
4—1½-yd. 36" ga. Insley Steel V Dump Cars.
2—3½-ton 36" ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg., Chicago
Railway Exchange Bldg. St. Louis, Mo. 101 West 31st St. New York

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Leahy 3x6' Enclosed 3-deck Vibrating Screen.
LaDal 3x6' 2-deck Vibrating Screen.
Robins Heavy Duty 52"x7' Vibrating Screen.
Mitchell A.C. Electric 3x8' Vibrating Screen.
Link-Belt 40' Vertical Elevator, 12" buckets.
Jeffrey 24' Vertical Elevator, 12" buckets.
Jeffrey 30' Elevator, 10" buckets, encased.

G. A. UNVERZAGT
15 Park Row New York City

(Classified Advertising Continued on Next Page)

Continued from Preceding Page

USED EQUIPMENT

GOOD USED EQUIPMENT

SELECTED SPECIAL ITEMS

1—No. 1260 Jeffrey Bakstad Jaw Crusher.
2—36"x54", 48"x72" Buchanan Jaw Crushers, all steel, Type C.
2—20" Superior McCully Gyratory Crushers, short head type.
1—42" Merrick Conveyor Weightometer.
1—8'8"x85' Ruggles-Coles Class A Rotary Dryer; also 2—5'x26'.
1—5-roll Raymond high-side Mill.
2—3-roll Raymond high-side Mills.
3—5'x50' Allis-Chalmers Rotary Dryers.
1—3'x125' Rotary Kiln.
5—6'6"x60' Vulcan Rotary Kilns.
1—3'x25' Bonnot Rotary Dryer-Kiln.
1—8'x12' Oliver Rotary Filter.
1—12' Gayco Air Classifier.
5—5'x22' Gates iron-lined Tube Mills.
1—7"x24" Sturtevant Jaw Crusher, to ½".
1—36"x36" Gruendler Hammer Mill, roller bearing, No. 4XC.
1—36"x24" Jeffrey Type D Hammer Mill.
1—7' Symons Cone Crusher.
2—20x14, 36x16 Sturtevant Crushing Rolls.
1—30x10 Colo. Iron Wks., Crushing Roll.
1—24"x72" Magnetic Pulley, complete.
6—Hardinge Ball Mills, 4½x16, 6x22, 6x36, 7x36, 8x22, 8x30.
1—3'x12' Hendy iron-lined Tube Mill.
2—6'x35' Louisville hot-air Rotary Dryers.
2—6'x45' Rotary Dryers—MONEL LINED.
8—3x5, 4x5, 4x7 Tyler Screens.
1—4'x8' Rotex, single deck.
1—305' 20" Conveyor, motor, reducer.
1—48" C/C enclosed Bucket Elevator, 14" buckets, 3/32" rubber covered 8-ply belt, with motor and reducer.
2—Shepard-Niles Traveling Cranes, 20-ton, 30' span—10-ton, 24' span, hand, chain operated.
1—16' Allis-Chalmers Log Washer.
1—25' Allis-Chalmers Log Washer.
8—6" Georgia Iron Works Dredge Pumps.

SEND FOR BULLETIN OF

our regular stock of Crushers; Vibrating Screens; Ball, Rod and Tube Mills; Air Compressors; Rotary Kilns and Dryers; Hardinge Ball and Pebble Mills; Raymond and other Pulverizers; Air Classifiers; Thickeners; Wet Classifiers; Filter Presses, Continuous Filters, etc.

CONSOLIDATED PRODUCTS COMPANY, INC.

15 - 16 - 17 Park Row, New York City

Shops and Yards at Newark, N. J. cover eight acres.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

GEORGE HAISS MFG. CO., Inc — **HAISS** — **Park Ave. & 143rd St. New York**

Send me full details and prices on equipment checked:

FACTORY REBUILT CLAM SHELL BUCKETS

☐ 1—Haiss Rehandling 1½-yd. bucket
☐ 1—Blaw-Knox ¾-yd. Dreadnaught Bucket
☐ 1—Owen 2½-yd. Type "S" Bucket
☐ 1—Haiss 1-yd. HiPower Digging Bucket
☐ 1—Haiss 1-yd. Contractor Type Bucket
☐ 1—Hayward 1½-yd. Type "E" Bucket
☐ 1—Haiss ½-yd. HiPower Digging Bucket
☐ 1—Hayward 1¼-yd. Type "E" Bucket

Factory Rebuilt Truck Loader & Belt Conveyor

☐ 1—Haiss 2-yd. a min. Creeper Truck Loader
☐ 1—Haiss 1¼-yd. a min. Creeper Truck Loader
☐ 1—Haiss 25 ft. 16 in. Trough Conveyor, LeRoi, Gas.

Name .....
Address .....

USED EQUIPMENT

400 K. W. Busch Sulzer Diesel Unit.
100 H.P. Worthington Diesel Elec. Unit.
750-yd. and 1,250-yd. Asphalt Plants.
K44 Link Belt Cat. Dragline and Shovel.
2—2-yd. cap. Bucyrus Diesel Draglines.
½-yd. cap. Byers Shovel and Crane.
Champion 1030 Roller-Bearing Jaw Crusher.
18x36 Farrel B Jaw Crusher.
48x36 Allis-Chalmers Jaw Crusher.
Pennsylvania SX4 and SX6 Hammermills.
Clyde Lime Hydrator.
Raymond Size O Lime Pulverizer.
Keystone Gasoline-Operated Well Drill.
Sanderson 14 Electric Well Drill.
Ingersoll-Rand 34 and 50 Drill Sharpeners.
36x84 and 48x72 Rotex Screen.
550-ft. Worthington Duplex Compressor.
6-ton and 7½-ton Universal Truck Cranes.
110-ft., 220-ft. and 320-ft. Portable Compressors.

R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

Used Sauerman Drag Line Equipment
Including—

1—110'—O Mast.
1—Electric two-speed Hoist without motor.
1—New 1⅜" dia. Track Cable, 924'-0 long.
1—New 1⅜" dia. Guy Cable, 320'-0 long.
1—New 1¼" dia. Guy Cable, 480'-0 long.
1—Trolley.
2—1½-yard Buckets.
Lot of used cable, guy lines, pull-in line, winch blocks, etc.
2—Sets Triple Sheave Blocks.
3—Winches for track cable.
Spare Parts.

Pittsburgh Plate Glass Company
Barberton, Ohio

Jaw Crushers—2"x4" up to 66"x84".
Crushing Rolls—12"x12" up to 54"x64"—Gyratory Crushers.
Ring Roll Mills — No. 0 and No. 1 — Swing Hammer Mills.
Rotary Fine Crushers—No. 1, No. 1½, No. 2.
Direct Heat Rotary Dryers—4'x30', 5'x30', 5½'x40', 6'x50', and 3½'x25'.
Semi-Indirect Heat Dryers, 4'x30', 4½'x26', 5'x30' and 8½'x75'.
Cement Kilns—3' up to 8' diameter.
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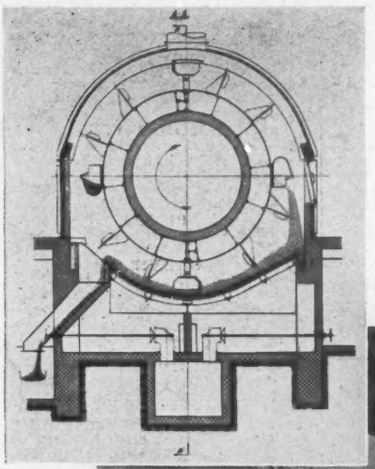

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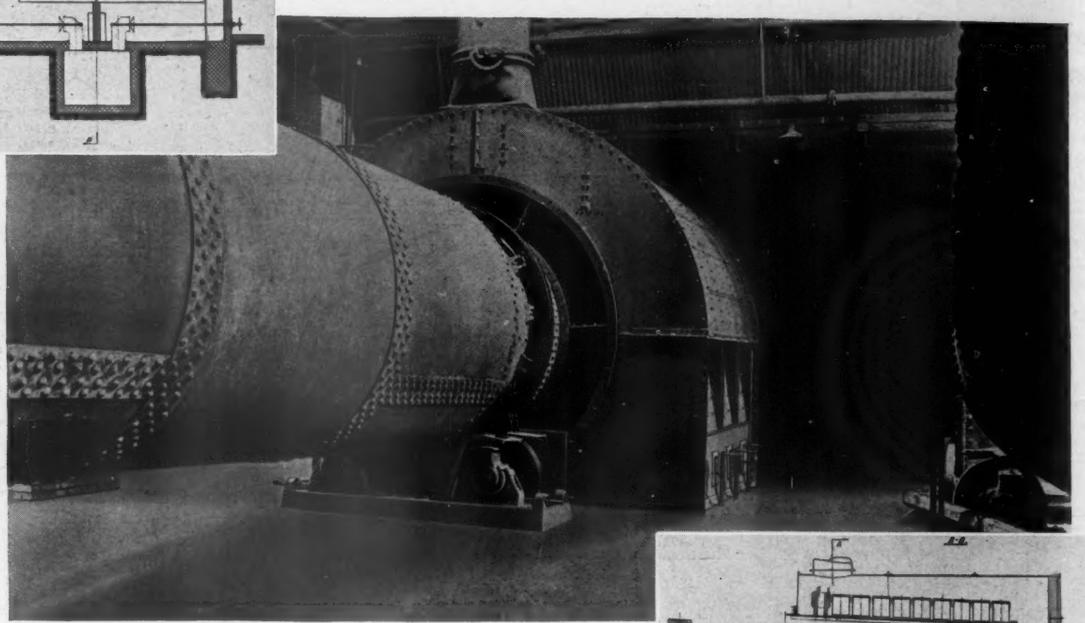

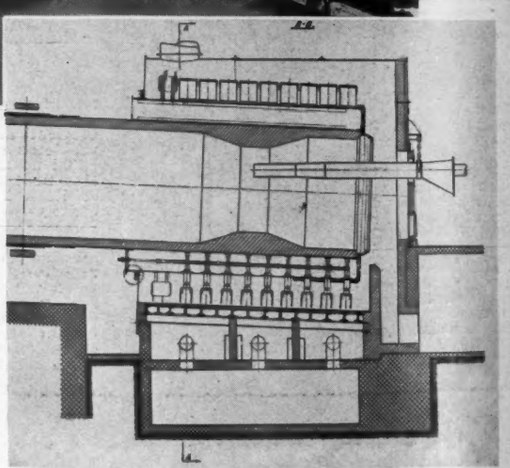

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